Background dope such as traffic projections
etc back to annual files

Goldman
Sachs

Goldman, Sachs & Co. | 55 Broad Street | New York, New York 10004
Tel: 212-676-7489

Michael R. Armellino
Vice President
Investment Research Department

Goldman Sachs

10th Floor

November 12, 1979

Mr. G. B. Aydelott
Chairman of the Board and President
Rio Grande Industries, Inc.
1515 Arapahoe Street
Denver, Colorado 80217

Dear Mr. Aydelott:

I very much appreciate your meeting with me on November 6. All of the Rio Grande officers with whom I met were most helpful. More than anything, I was impressed with their morale and dedication to your company.

I expect to follow Rio Grande's fortunes more closely in the future and look forward to meeting with you again.

Cordially,

Mike Armellino

Goldman, Sachs & Co. | 55 Broad Street | New York, New York 10004
Tel: 212-676-7489

Michael R. Armellino
Vice President
Investment Research Department

Goldman Sachs Seminar May 1977

November 12, 1979

Mr. Jack E. Timberlake
Director, Unit Train Operations
Denver & Rio Grande Western Railroad Company
1515 Arapahoe Street
Denver, Colorado 80217

Dear Jack:

I am most grateful to you and your associates for beginning my education regarding the Rio Grande. You are a most interesting group, and I enjoyed each of my interviews.

Most of all, I enjoyed having dinner with you and Ruth. Both of you went well beyond the call of duty, considering the circumstances. I hope that all is well with your daughter.

We will be in touch again, and the gap will not be two years as it was since our last meeting.

Cordially,

Mike

Goldman, Sachs & Co. | 55 Broad Street | New York, New York 10004
Tel: 212-676-7488

William J. Kealy, C.F.A.
Director of Research
Investment Research Department

Goldman Sachs

Mr. John E. Timberlake,
Director of Unit Train Operations
Rio Grande Industries, Inc.
1515 Arapahoe Street
Denver, Colorado 80217

May 23, 1977

Dear Mr. Timberlake:

Judging by the enthusiasm of the many comments we have received to date, we consider our energy seminar to have been a tremendous success. I greatly appreciated your willingness to participate, and feel that your contribution was very important to the success of the day. Your persuasive argument that the western railroads will have little difficulty transporting the amounts of coal production envisioned by the President made a strong impression on the audience, many of whom probably left the seminar with an altered attitude toward coal transport problems.

We have received from our vendors an unedited transcript of the day's proceedings. Unless you have any objections, we intend to print a lightly edited version of the transcript so that we can send a copy to those of our clients who were unable to attend. Of course, we will send you a copy before we release it to our clients.

The many energy problems which were discussed at the seminar are not, of course, going to lose their significance in the next few years. Indeed, I foresee an ongoing debate, one which may never reach a clear resolution. For that reason, I would like it very much if we could keep our lines of communication open.

Again, we were pleased with the presentations of all of our speakers and hope that you enjoyed the day as much as we did. Thank you very much.

Sincerely,

Bill Kealy

William J. Kealy

WJK:km

Goldman Sachs Seminar May 1977

Hartford Plaza
Hartford, Connecticut 06115

THE HARTFORD

May 9, 1977

Mr. John Timberlake,
Director of Unit Train Operations
Rio Grande Industries, Inc.
1515 Arapahoe Street
Denver, Colorado 80202

Dear Mr. Timberlake:

I found your presentation at the Goldman Sachs & Co. Research Seminar last week to be very interesting and helpful.

If you are making the text of your presentation available, I would appreciate your sending me a copy.

Yours truly,

G. Frederick Schroeder, Jr. (map)

G. Frederick Schroeder, Jr.
Senior Investment Analyst

GFS:map

Hartford Fire Insurance Company
Hartford Accident and Indemnity Company
Hartford Life Insurance Company
Hartford Casualty Insurance Company
New York Underwriters Insurance Company
Twin City Fire Insurance Company

Goldman
Sachs

May 6, 1977

Mr. John E. Timberlake
Director, Unit Train Operations
The Denver & Rio Grande Railroad Co.
P.O. Box 5482
Denver, Colorado 80217

Dear Jack:

Once again our sincere thanks and appreciation for the fine presentation you made before the seminar yesterday. In talking informally to several of our guests, we are convinced the pipeline people didn't make any new friends. Good work!

Our best regards to Ruth. If we are in Denver, we hope to be able to see you, and if you get the chance to visit New York again, please feel free to stop by.

Sincerely,

Mike
Michael Armellino &

Candace A. Campbell
Candace A. Campbell

CAC/ch

P.S. Hope the enclosed will make you feel a little better about New York.

Goldman Sach Seminar May 1977

Background docs & Suchas traffic projections

HEARTS AND MINDS

We can be sure that all the special-interest groups in the country will attack the part of this plan that affects them directly. They will say that sacrifice is fine, as long as other people do it.

—President Carter in his energy address to the nation

Jimmy Carter fully expects to find himself locked in battle with industrialists, consumerists and environmentalists who oppose one aspect or another of his complex new energy policy. But so far, the response of the "special-interest groups" has been surprisingly muted. Texaco decided against even a press release last week. Executives at Mobil Oil, normally one of the oil industry's most pugnacious defenders, chuckled over the timing of their latest "advocacy ad": it ran the day after the President's energy message to Congress—and it supported the Boys Club of America.

The Atomic Industrial Forum vetoed an ad campaign for nuclear energy. Continental Trailways took out ads congratulating Carter. And General Motors chairman Thomas A. Murphy, who only three weeks ago called the President's proposed taxes on gas and gas guzzlers the "most simplistic, irresponsible and shortsighted ideas ever conceived," very nearly endorsed Carter's new package.

Needed now: A national energy policy

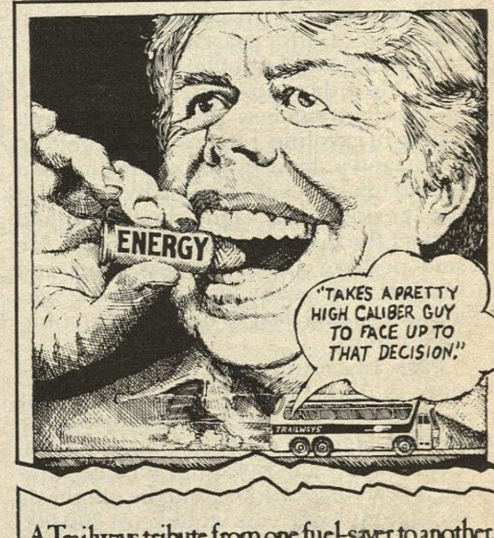
1. Shortage in the midst of plenty

Whether the United States can continue in its role of world leadership from a position of strength—

In the same way expanding nuclear energy to substantially above its present 3 percent of the

Mobil

Robert R. McElroy—Newsweek


ENERGY
"TAKES A PRETTY HIGH CALIBER GUY TO FACE UP TO THAT DECISION."
TRAILWAYS

A Trailways tribute from one fuel-saver to another.

Energetic reactions: Schmertz mobilized Mobil, Trailways complimented Carter

There are many reasons for the laid-back caution. By equating his energy policy with wartime sacrifices, Carter made it all but impossible for critics to lash back too quickly without appearing unpatriotic. His package was also extremely complex; not all of its details will be clear to lobbyists for weeks. "We have had a little peek inside the kimono: now we are waiting for the whole body to be revealed," said Craig Hosmer, chief lobbyist for the American Nuclear Energy Council. Most important of all, Carter's strategy of presenting a single hardship-for-all package to Congress makes it more difficult for most lobbyists to single out the individual ideas that they oppose.

ACTION STATIONS

The relative silence along the Potomac, however, may simply be the lull before a real storm. Oilmen are upset over the stress the President gave to conservation—at the expense of incentives for production and exploration. Auto lobbyists grump loudly over the taxes on big cars. Coal men argue that it will be impossible for them to meet Carter's new production standards unless he also lowers his standards for environmental protection. And environmentalists, who are generally pleased with the President's policy, are ready to swing into action if he backslides on that issue.

Slowly and cautiously, companies and groups of all persuasions are mapping their lobbying strategies. At Exxon headquarters in New York, public-relations men and company economists huddled over TV sets to watch the President's energy address to Congress. Mobil Oil executives began a line-by-line analysis of the speech the next day. "If we don't have good arguments on why the policy of the President is flawed, then we will lose," said David Foster, executive director of the Natural Gas Supply Committee. "Credibility is the answer," he added, "and right now the oil and gas industry by itself couldn't lobby Mother's Day through Congress."

In an extraordinary turnabout, private industry seemed to be adopting tactics long used by public-interest groups: lobbying at the grass roots. "At the risk of offending some of my members, who are extremely fond of full-page ads," said Foster, "I believe that grass-roots political activity is more effective . . . than one-to-one lobbying on the Hill." His gas group now plans to drum up support among workers who lost jobs last winter when natural-gas supplies ran low. Other lobbyists are studying the Toledo, Ohio, district of Rep. Thomas Ashley, the new chairman of the House Select Committee on Energy—many of whose constituents are auto-parts workers. To counter such pressures, Common Cause plans to scrutinize records of all 40 members of Ashley's committee for links to energy interests.

Perhaps the bluntest response to the President's policy last week was that adopted by the Edison Electric Institute, the voice of investor-owned utilities. EEI president Donald Crawford barnstormed the "AM America" show on ABC, worked the editorial board of The Baltimore Sun, and accepted an invitation to speak on "Meet the Press" this week. EEI's team of 30 Washington lobbyists, which has risen by 22 members over the past year alone, was also laying plans to confer with chairman Ashley and to beard energy czar James Schlesinger.

MARCHING ORDERS

Mobil Oil's approach will also be energetic. Herbert Schmertz, the firm's media wizard, can tap a public-affairs staff of 60 for ideas, send marching orders to seven full-time lobbyists in Washington and use Mobil executives for defense duty on TV talk shows. The company began by buying two full pages of advertising space in The New York Times to rerun a series of advocacy ads dismissing the oil crisis as "a shortage in the midst of plenty." In private, Schmertz also accused the Carter Administration of taking "cheap shots" at the oil industry. But he said with a grin, "It is a myth that we will be sending troops to the capital."

With the President's policy wearing on the country's biggest industries, its most powerful unions and its most fervent public-advocate groups, the lobbying may become bloody. "This is going to be one long fight," predicted Common Cause president David Cohen. "The strategy of the special interests is always to wear the opposition down." And with Carter shooting for passage of the energy package by the October Congressional recess, the lobbying war may soon be getting hotter.

—TOM MATHEWS with ELAINE SHANNON in Washington and SUSAN AGREST in New York

DETROIT ON THE SPOT

The morning after President Carter proposed an excise tax on "gas guzzlers" twelve New Yorkers put down deposits on one of Potamkin Cadillac's high-powered models—nine more than normal for a typical spring morning. "You have to realize," explained dealer Philip Mittleman, "that the Cadillac buyer is not going to change his habits over taxation." Yet at Roselle AMC/Jeep in the Chicago suburb of Schaumburg, a customer wheeled up in his 1975 Cadillac Eldorado convertible and traded it in for a Pacer station wagon—"all because of gas mileage," said used-car manager Roger Rudin.

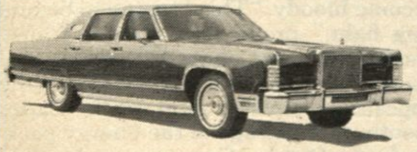
That schizoid response was understandable. Carter was vague on important points and left others to be filled in later. He did propose taxes on 1978 model cars getting less than 18 miles per gallon of gasoline, rebates on cars getting more, and a stand-by tax on gasoline that would total 50 cents a gallon by 1990. But the President was vague about how he'd collect the taxes and pay the rebates. He said nothing about campers, vans and recreational vehicles—notorious gas guzzlers—and next to nothing about foreign cars.

Pain: In Detroit, the immediate reaction to the President's proposal was muted—despite the fact that the President's plan may cause automakers pain. Economist Otto Eckstein, for one, predicts that dislocations from the emphasis on high-mileage cars would cost 300,000 sales in the next three years.

Still, the automakers appeared to be somewhat resigned to all the headaches involved. General Motors chairman Thomas A. Murphy, who earlier this month had called any such tax program "simplistic, irresponsible and short-sighted," now sounded much more conciliatory. He said he still felt that gas-guzzler taxes would unfairly penalize a large family that simply needed a bigger car for comfortable transportation, but added: "I think those are details . . . that we ought to work out. The important point here is, the President has focused attention on the fact that there is a problem." Ford Motor president Lee Iacocca said the President's program would "place the government in the position of not only controlling the industry, but the market." Other auto men worried that a heavy tax on new big cars might persuade owners to hold on to their old ones.

LINCOLN CONTINENTAL

TAX $345*



ENGINE: 460 cu. in. | MPG: 13

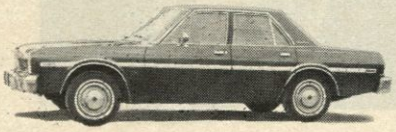
TRANSMISSION: AUTOMATIC

Sales Aid: The only real booster of the President's plan was AMC chairman Roy D. Chapin Jr., who saw it as a sales aid for an ailing company that has built its image on the small economy size. "What the President is proposing parallels what American Motors has been saying for a long time," Chapin said. All the auto men opposed Carter's proposal for stand-by taxes on gasoline, maintaining they would be ineffective in cutting consumption and unfair in application. But most of them predicted that luxury cars would continue to attract buyers. "I think the President is creating a paper tiger so he can stick a spear into it," said a California Lincoln-Mercury dealer.

That is, if the government will let the companies meet the demand. Under mileage standards written into Federal law for next year, each company must achieve an average of 18 miles per gallon over all the cars it sells in the year—a figure rising to 27.5 miles per gallon in 1985. This will force each company to monitor production by computer on a daily basis to insure that it is meeting the 18-mpg standard. If a company does not meet the mileage standard, it can be penalized heavily; should GM sell 4 million cars next year averaging 17.8 miles per gallon—only .2 of a mile below the mandated average—it could be fined $40 million. And the customer could suffer as well; a prospective Continental or Cadillac buyer, for example, may find showrooms bare while Ford or GM bring their average back into line by cranking out extra Pintos and Chevettes—and trying to sell them.

DODGE ASPEN

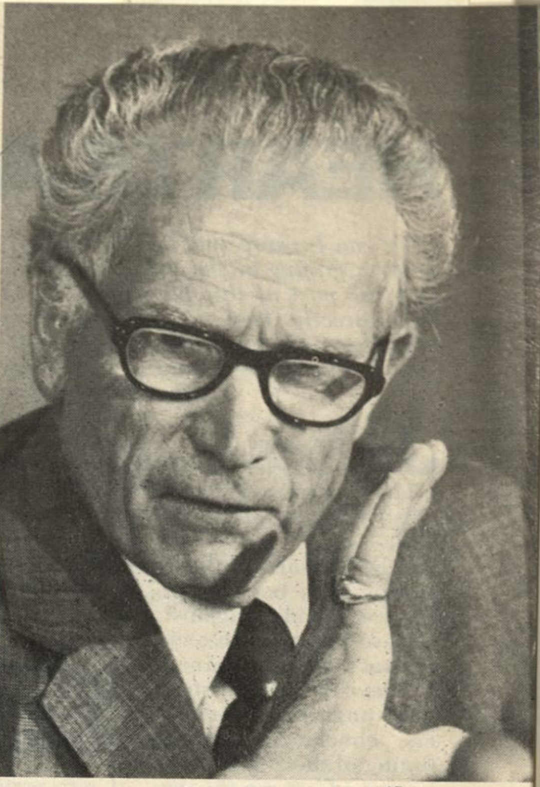
REBATE $89*



ENGINE: 225 cu. in. | MPG: 20

TRANSMISSION: MANUAL

Industry observers say that GM is in by far the best position to operate under new mileage rules. It reduced the size and increased the mileage of its standard-size cars this year; indeed, if the tax-rebate program had been in effect on 1977 models, GM would have been in a net rebate position. It will shrink its intermediate models in 1978 and its compacts in 1979. Ford and Chrysler have similar programs under way, but they are far behind GM and they could suffer badly in the salesroom if the tax-rebate program goes into effect next year.



AP

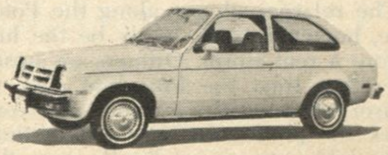
GM's Murphy: A somewhat muted reply

Thus, Ford and Chrysler lobbyists will be pushing for at least a year's delay in the start of the President's plan—and the industry will be using its considerable clout on Capitol Hill to reduce the tax penalties and the rebate prizes. "I do have concern about the administrators in Washington," summed up GM's Tom Murphy. "They don't understand the dimensions of the American public and where they live, where they work, what they need. They are men of zeal, but they are without understanding. I think we can contribute to that understanding."

—TOM NICHOLSON with JAMES C. JONES in Detroit and bureau reports

CHEVROLET CHEVETTE

REBATE $449*



ENGINE: 98 cu. in. | MPG: 36

TRANSMISSION: MANUAL

Ron Bracco

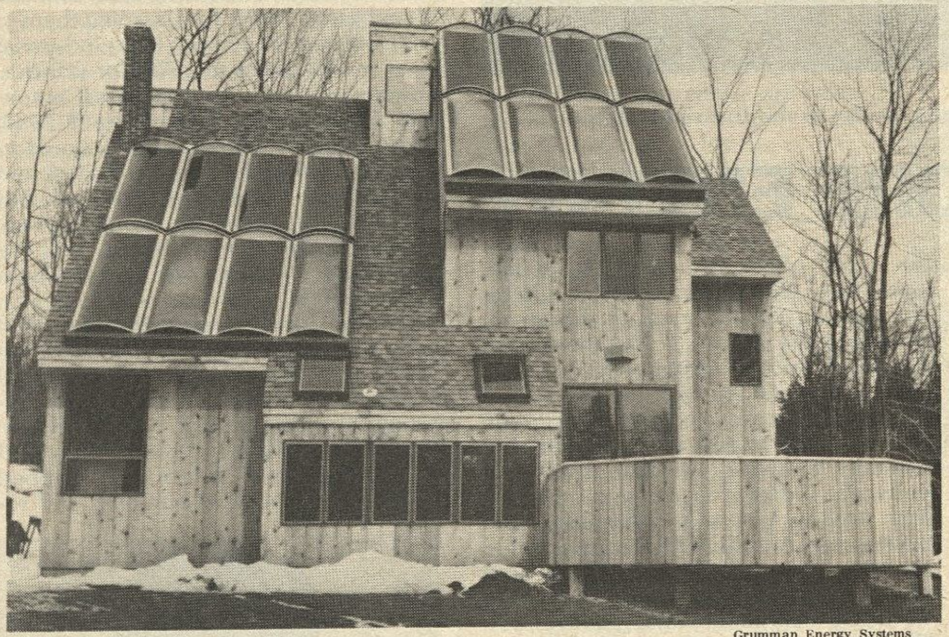
---

*Taxes and rebates as proposed for 1978, applied to 1977 auto models.

Goldman Sachs Seminar May 1977

strict surface mining on prime farm lands and in national forests. "It's the story we've come to expect from Washington," complained president Otis Gibson of the Illinois Coal Operators Association. "We're going to increase production, but we're going to increase restrictions on the mining and burning of coal. That's not a very consistent program."

While the coal industry will probably be able to live with the strip-mining bill, the clean-air requirements pose far harder questions. The President wants to expand research to find ways to make coal burn more cleanly, and he wants "scrubbers," which remove much of the sulfur dioxide from stack emissions, installed on all new coal-fired electric power plants. But scrubbers are expensive and industrialists argue that their technology is undependable. Joel Price, a Wall Street coal analyst, says scrubbers increase costs by $12 to $15 for each ton of coal burned.



Grumman Energy Systems

Vermont solar house: For venturesome owners, tax credits for using the sun

The utilities will find conversion to coal a problem, too. The Edison Electric Institute estimates that the cost of switching gas- and oil-fired power plants to coal between now and 1985 will be fully $50 billion—a particularly annoying expense to those utilities that in recent years had switched from coal to gas or oil as being cleaner and cheaper. Commonwealth Edison Co., for instance, spent $10 million five years ago to convert one of its Chicago stations from coal to gas. If it were to reconvert to coal now, the company says, the cost would be $110 million.

A QUESTION OF SINCERITY

But some experts think the utilities might get a reprieve. "There's absolutely not enough coal to handle a massive conversion by industry and utilities between now and 1985," says John Lichtblau, head of the Petroleum Industry Research Foundation. In fact, some critics question Carter's basic sincerity in setting targets for expanded coal production. "If coal is the chosen resource, why are we talking about boosting output only 8 per cent a year and not 20 per cent a year, which is surely attainable?" asks former CEA chairman Arthur Okun. "I bet it wouldn't cost $3 billion in credits for coal conversions. The program seems to have given up on the prospects of doing anything about production."

Coal's many problems are the reason energy experts hope to develop other sources of power for the nation to live on once the oil and gas are gone. One, nuclear power, is clean and competitive and now produces about 3 per cent of the nation's energy. But it too poses environmental problems, and last week the President concluded that "as a last resort we must continue to use increasing amounts of nuclear energy."

Carter reiterated his stand against the fast-breeder reactor, which produces plutonium that could be fashioned into a nuclear bomb. But he said the nation must increase its production of enriched uranium for nuclear plants, with centrifuge technology that uses one-tenth as much energy as existing gaseous-diffusion plants. The President also proposed a reform in the licensing of nuclear plants—without a letup in standards—to cut delays in construction that have run as long as ten years.

The most promising new source of energy may be the sun. Solar hot-water heaters, and to a lesser extent solar heating and cooling systems, are already economically feasible in some parts of the country. The systems are expensive—a water heater runs from $1,200 to $2,000 while space heating costs a homeowner $4,000 to $10,000. And there must always be a conventional system for backup on cloudy days, which adds to the initial investment. But operating costs are lower than with other fuels, and in time the systems pay for themselves.

At the cost of oil in New England today, a $1,500 solar hot-water system would pay for itself in ten years. But as the price of oil goes up, the pay-back period shortens. And President Carter last week proposed giving income-tax credits to spur Americans to buy solar equipment quickly. Initially, the credit would be 40 per cent of the first $1,000 spent on solar systems and 25 per cent of the next $6,400. The credits would decrease gradually and run out in 1984.

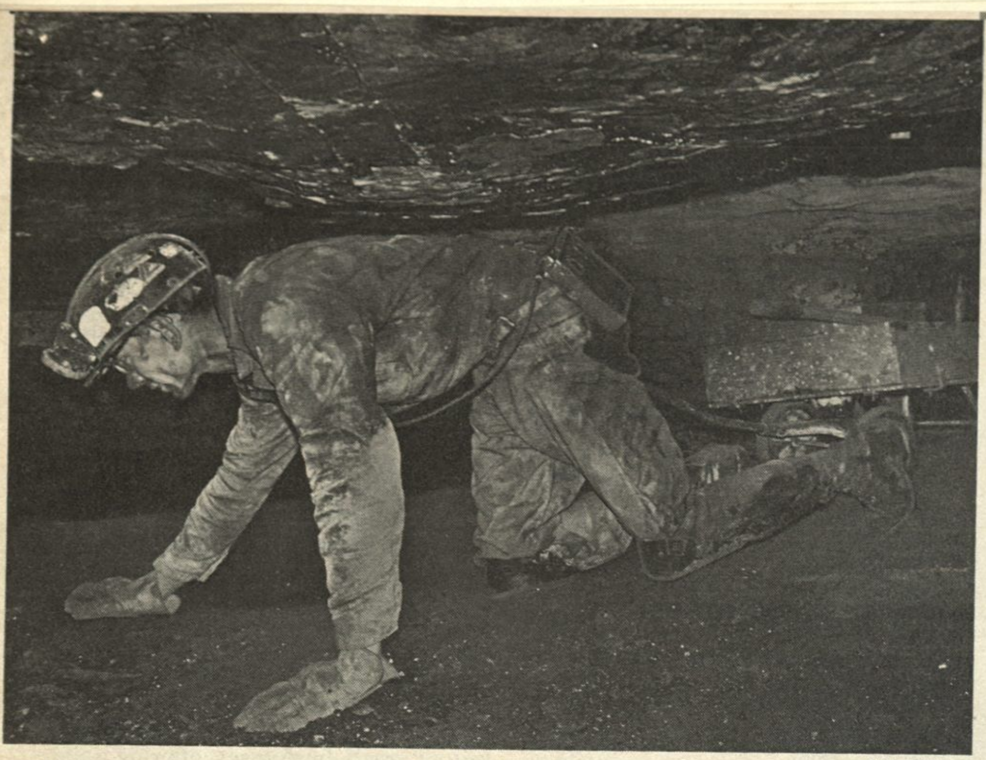
A SUNNY BUSINESS

"There's no doubt solar will evolve very rapidly as a significant source of energy," says Richard Messing, energy specialist with Arthur D. Little, Inc. Many entrepreneurs already are cashing in. The telephone book for Marin County, Calif., has two-thirds of a yellow page full of small businesses offering solar power. One firm alone, FAFCO, Inc., of Menlo Park, Calif., sold $6 million worth of solar swimming-pool heaters last year. And one day, solar energy may be doing far bigger jobs. A solar power station, 80 per cent funded by the Energy Research and Development Administration, is expected to go into operation near Barstow, Calif., by 1981. The plant will use a field of up to 1,700 mirrors focusing the sun on a boiler. "I don't think there's any technical reason why this shouldn't work," says Clifford Yokomizo of Sandia Laboratories, who is managing the project.

Scientists are experimenting with many other unusual sources of power. Natural steam from the earth is turning generating plants in northern California, and the California Energy Commission says that by 1985 some electricity in the state should be generated by efficient new windmills. But these sources are supplemental at best. Any new energy source that could help carry the burden of the nation's power load is at least 25 years away. That includes generating power from the tides, exploiting the variations in ocean temperatures at different depths, and nuclear fusion, a far cleaner, less hazardous form of nuclear power but still requiring scientific breakthroughs.

In the long run, it may well be that some combination of these or other exotic power sources will be fueling the nation's economy. But it takes years of development to prove out a new source, and staggering levels of investment to gear the national system to run on it. "None of these things is cheap," says ERDA's William D. Jackson. "They all cost a billion dollars before you can really get them on the line." That inevitably means there will be a sizable gap to be spanned—and in Carter's vision of the coming years, it will be the humble coal man who will trudge across the bridge.

—DAVID PAULY with JEFF B. COPELAND in Washington, FRANK MAIER and CHRIS J. HARPER in Chicago and bureau reports



Earl Dotter

West Virginia coal miner: Walking a bridge to the future of power

GETTING MORE ENERGY

As the nation's oilmen see it, the biggest flaw in Jimmy Carter's energy policy is that it does little to spur production of more oil and natural gas. But the emphasis was intentional. Convinced that the U.S. is rapidly losing its oil and gas reserves, Carter's men have decided to begin weaning the economy from its petroleum habit and forcing it to rely more on its rich reserves of coal. At the same time, the President aims to launch a long-range effort to develop power from the atom, the sun, the wind and the sea.

But is the end of the oil age really that close? Carter's energy experts believe that reserves of oil and gas will be 90 per cent depleted by the year 2000. But last week, such unlikely allies as The Wall Street Journal and Ralph Nader were suggesting that the outlook would not be so Malthusian if energy companies had more incentive to explore. "The minute someone burned the first barrel of oil, we started running out," said Nader. "The question is, when does it end? That's purely a matter of price and environmental costs."

In that reckoning, rising prices and profits would provide the funds for more exploration of the vast reaches of the earth that have not yet been plumbed. Optimists believe there may be a thousand-year supply of gas in the Gulf of Mexico, 50 billion to 100 billion barrels of oil in the Alaskan fields and 105 billion barrels available to new recovery methods in existing oil fields. But even if no major new deposits turn up, there are huge known reserves in the Canadian tar sands (600 billion barrels) and the U.S. oil shale deposits (perhaps 2 trillion barrels), waiting for prices high enough to warrant the costly effort to squeeze them out.

As many oil executives tell it, Carter has actually cut off some of the incentives they already had. Under the current system of price controls, says Ted Eck, chief economist for Standard Oil Co. of Indiana, domestic revenue from crude oil was going to rise about 10 per cent annually between now and 1980. But under the Carter plan, he says, revenues from crude will rise by only 6 to 7 per cent a year. And despite the proposal to raise the price of all newly discovered gas to $1.75 per 1,000 cubic feet, there would be little gain in total gas revenues. That's because more than half of the new gas is now being sold in unregulated intrastate markets at about $2 per 1,000 cubic feet—a rate that would drop as prices for interstate gas went up.

HUNTING FOR BLESSINGS

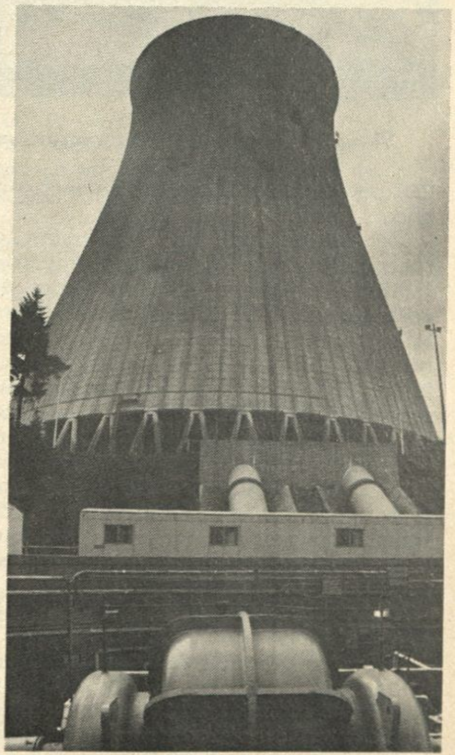
Nonetheless, the oil industry usually finds unobtrusive blessings in the fine print of government decisions. There was at least one such boon last week as Carter moved to reopen a tax loophole that had been closed in last year's reforms, permitting huge write-offs of "intangible" drilling costs by independent oilmen and thus restoring them to equal treatment with the major firms.

As the Carter plan moves through Congress, there is sure to be fierce skirmishing over similar lucrative details such as the precise definition of "new" and "old" oil. And the plan does contain some certified incentives for the industry. The price of newly discovered oil, for example, would be allowed to rise in three years to the current world price of about $13.50 a barrel, with added allowances for inflation. And many independent industry experts agree that the oil and gas prices Carter envisions are high enough to encourage further exploration and production. But the Administration is far from convinced that there is that much oil to be found. "Even if they got all the incentives they wanted," said one senior energy official, "even then they couldn't get oil production up to the 1970 level." It would be foolish to gamble the nation's future on oil that may not be there, the Administration argues. That's where coal comes in.

FORCING A SWITCH

America is the Saudi Arabia of coal, with enough in the ground to supply all of its energy needs for centuries. Carter wants to increase coal production to 1 billion tons a year by 1985, about 65 per cent above current output. The plan is to tax utilities and other industries that use oil and gas as boiler fuel, forcing them to switch to coal. The tax on large industrial users would begin in 1979; for utilities, which would require more time to convert, it would be delayed until 1983. Such a massive shift to coal seemed to promise a boom for coal producers and the railroads that would haul coal. But the costs of using coal are rising on every front—and both the digging and the burning of it clash with Carter's own environmental policies.

The President insisted that he could meet his goals for production while adhering to strict standards on clean air and strip-mining. Carter supports, for instance, the bill passed by the House Interior Committee last week that would force producers to return coal-stripped lands to their original contours and re-



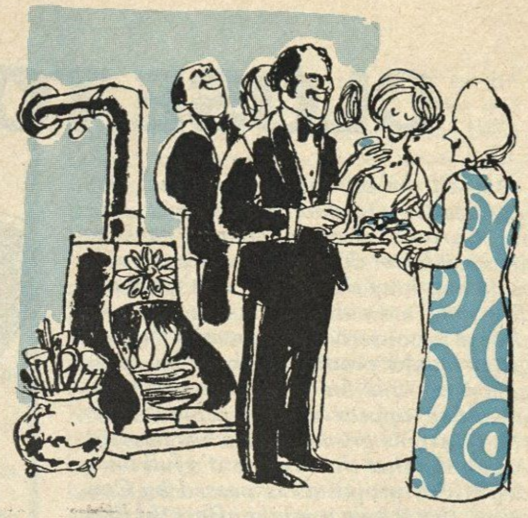
Gordon Clark—Echave & Associates

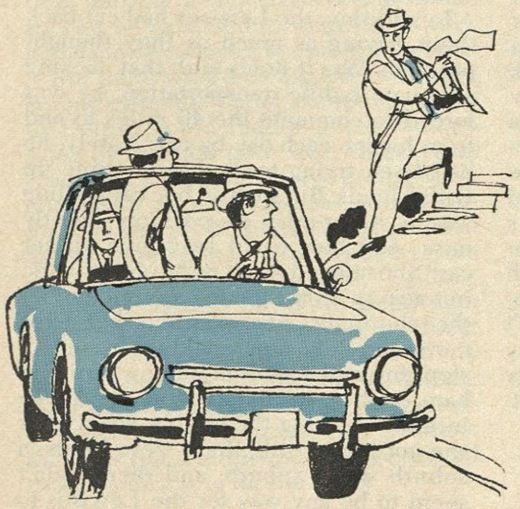
Oregon nuclear plant: No breeders

now, under the Carter program, the investment could entitle them to a sizable tax credit, perhaps as much as $230. When they decided to do it, it was actually rather simple. The utility recommended a reputable contractor and let them pay off their insulation loan as part of their monthly bill. The only problem was that it was several weeks before the insulation was actually installed; demand for the stuff was so high that supplies were beginning to run short.

The Lewises also considered the idea of converting their house from gas to electric heat. After all, they reasoned, hadn't the President stressed the importance of shifting away from reliance on scarce fuels like natural gas? But while such a move might have benefited the nation as a whole, it turned out to make no sense for the Lewises as a family. The switchover would cost them close to $3,000, they found out, and would increase their annual heating bill by $100 or so. Such a switch might have made sense if they lived in the Pacific Northwest, where massive hydroelectric generation produces the nation's cheapest electricity—and where most natural gas is imported from Canada at sky-high world prices. But in Troy, it would be economic madness.

They also briefly entertained the notion of installing a solar-powered water heater, which they heard could cut their gas consumption by as much as 20 per cent. The idea was especially attractive since under the President's program this purchase too would entitle them to a hefty tax credit.





SO MUCH FOR SOLAR

It quickly lost its luster, however, when Ron and Jean realized that the dollar savings resulting from a 20 per cent reduction in their gas consumption would amount to only about $75 a year—hardly enough to justify spending $1,500 for a solar unit. Such an investment would be worthwhile only for a family living, say, in Boston, where most homes are heated by oil—now about twice as expensive as the gas the Lewises were using. So instead of buying a solar heater, Ron and Jean went to the shopping mall and spent $20 on a fiber-glass insulation blanket to wrap around their old gas-fired water heater. According to the salesman, the blanket would cut their unit's heat loss in half.

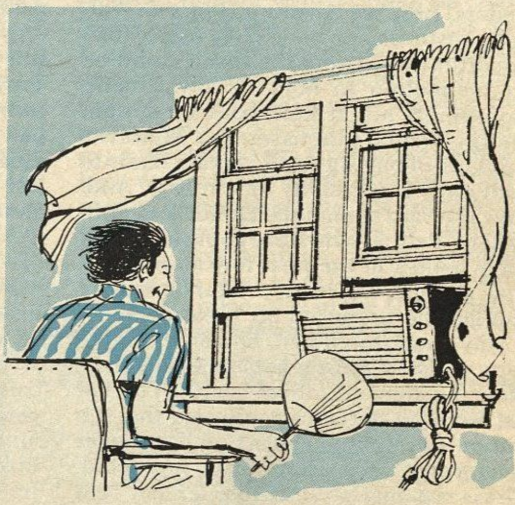
After a while, the Lewises began to realize that they were a lot better off than they thought. For one thing, the natural gas with which they heated their home was still relatively cheap. For another, their electric company, Detroit Edison, did not have to spend huge sums converting gas- and oil-fired generators to coal because it was already using coal to produce 82 per cent of its electricity when Carter first announced his intention to make that practice mandatory. Thus, there were no massive capital investment costs to be passed along to consumers—and Ron and Jean's electric bill did not skyrocket, as they feared it might.

They wouldn't have been nearly as lucky in New York City, where Consolidated Edison was finding itself forced to convert a system that relied on oil for 70 per cent of its generating capacity, or in the Southwest, where many utilities used natural gas almost exclusively. But for the residents of Troy and nearby communities, electric rates went up less than 15 per cent in the two years following enactment of the Carter program—an increase of just $4 or $5 a month for the Lewises.

At the same time, the price of gasoline was rising. But here, too, Ron and Jean found themselves able to absorb the increases with surprising ease. It wasn't hard to see why. The increases totaled almost 20 cents a gallon by 1979, but that was less than $4 a week for the Lewises—and at least part of that was coming back as a Federal tax rebate. In any case, the Lewises were buying fewer gallons. When they started thinking about trading in Jean's 1974 Firebird for a 1979 model, they meant to step up to a standard-size car. But after considering the $436 gas-guzzler tax they would have to pay—as well as the likelihood that gasoline prices would rise another 5 to 7 cents a gallon in the next year—they decided to opt for a compact car even if they had to stack luggage on the roof. That meant a bonus: they avoided the penalty tax and got a $165 rebate on the smaller car.

A PERVASIVE DIFFERENCE

It was the first time in a while—indeed, since they decided to insulate their house—that the Lewises felt as if the Carter package had made a difference in their lives. But whether they were aware of it or not, the program had been affecting them all along. Because of it, Ron and Jean were paying more for just about everything they purchased. Predictably, energy-intensive goods—ranging from polyester suits to plastic bags—went up the most. But virtually no product or commodity was unscathed; in all, Carter's program added about 1 per cent to the annual inflation rate. It also helped boost their local taxes, raising the cost of everything from heating schools to running garbage trucks.



The Lewises, however, didn't see it that way. All they knew was that the crunch they had feared had never materialized. By 1980, their monthly energy costs had risen to just $173—only $41 more than what they had been spending when Carter first unveiled his program back in 1977. And even that blow was well cushioned by the generous rebates the government had instituted to recycle the new energy taxes that had been slapped on to discourage consumption. The rebate on the wellhead tax, a levy imposed to raise the price of "old" oil closer to world levels, was putting $188 a year back into the family pockets; the gasoline-tax rebate added another $500 or so. If that was what Carter meant by "the moral equivalent of war," the Lewises were ready to re-enlist.

—ALLAN J. MAYER

Goldman Sach Seminar May 1977

Background docs scenarios traffic projections the same changes are likely to occur.

If Jimmy Carter gets his way, U.S. industry will be forced to invest in more energy-efficient plants—and that could touch off a capital-spending boom in the years to come. "The engineers are going to be very busy," says Eckstein, "and business in general is going to have to make significant investments to substitute new equipment for oil and gas-run equipment." Auto manufacturers also will spend more as they shift their production mix to smaller cars. But the biggest outlays mandated by the Carter program will come from the nation's utilities, as they switch entirely to coal or nuclear-fired power plants. According to engineer Martin Baughman of the University of Texas, the cost of conversion for utilities in his state alone would amount to $15 billion to $20 billion by 1985.

THE WAIT-AND-SEE RISK

In the short run, though, capital spending may well decline. With the final shape of the energy plan still unresolved, says Federal Reserve governor Henry C. Wallich, businessmen see "risks rather than opportunities"—and the result could be an inclination to hold off investment. Consumers might hold back on certain energy-related purchases, too. Motorists thinking of buying small cars are likely to wait until they qualify for a rebate. And, says Harvard economist Hendrik Houthakker, "People who were going to retrofit their homes in the next few months are now going to wait to do it later on so they can get the proposed tax breaks."

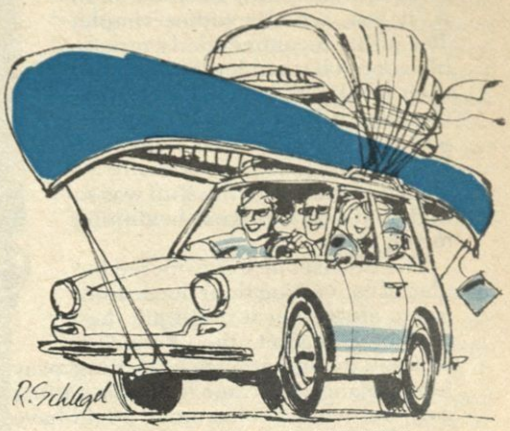
Any such slowdown, however temporary, will come just when the economy is showing signs of robust health. The latest batch of statistics confirmed that the nation's economic expansion is stronger than most forecasters had predicted. Gross national product rose 5.2 per cent in the first quarter—and government economists said that the rate would have been well over 6 per cent had it not been for the winter freeze. Personal income and housing starts showed huge gains in March, and inflation eased a bit, with the CPI rising 0.6 per cent, down from the 1 per cent increase in February.

The danger is that the economic expansion will stall—first because of uncertainty, then next year because of the Carter energy plan. "Even when all the details are decided, there is still no way to predict what will happen with much accuracy," says a top staffer at the CEA. "We simply have never tried anything like this forced change in general energy use on the American economy before." In short, Jimmy Carter is putting the nation's economy as well as his political neck on the line with his grand energy design—and should he fail, both could be the worse for it.

—MICHAEL RUBY with RICH THOMAS
in Washington and PAMELA LYNN
ABRAHAM in New York

CLOSE TO HOME

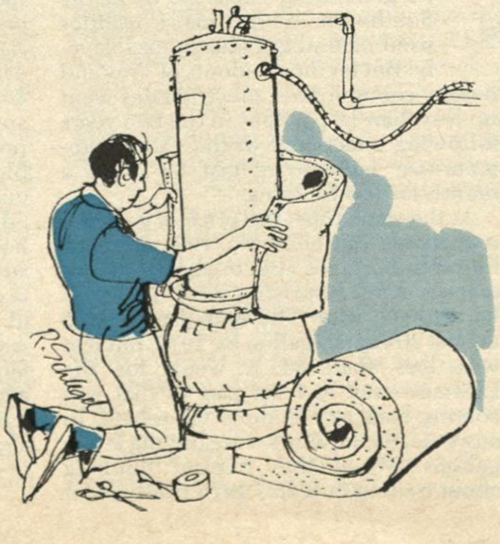
For all the talk of sacrifice that surrounded its introduction last week, Jimmy Carter's massive energy package does not seem designed to force people to do anything they really don't want to do. For individual consumers, who choose to conserve, the rewards the program would provide look to be fairly generous—and for those who don't, the penalties appear considerably milder than Carter's grim rhetoric has implied. Assuming that the President's full laundry list of proposals is passed by Congress, this is how it might affect the lives of a family of four living in a suburban community over the next few years. The family itself is a fictional composite, but its situation is based on fact.


Sketches by Ralph Schlegel

There was rejoicing in the White House that day late in 1977 when the Senate, following the House's lead, passed Jimmy Carter's wide-ranging energy program without major alterations. But in the sprawling Detroit suburb of Troy, Mich., Ron and Jean Lewis were running scared. "Use less and pay more" had an ominous ring to it. Their gas and electric bills had already doubled in the last four years; gasoline had gone up almost as much.

WHAT HAPPENS NOW?

So far, they had managed to keep their heads above water. Between Ron's job in a Detroit bank and Jean's part-time work as a statistician at a local community college, the two of them earned $21,000 a year—enough for the mortgage payments on their two-story brick house, the upkeep of their two cars, 15-year-old Jennifer's braces and 11-year-old Reed's tendency to break things. They even saved a little now and then. But with energy costs eating up a growing proportion of their income, they weren't sure how much longer they could stay afloat—especially if this new energy program were to send prices skyrocketing again.



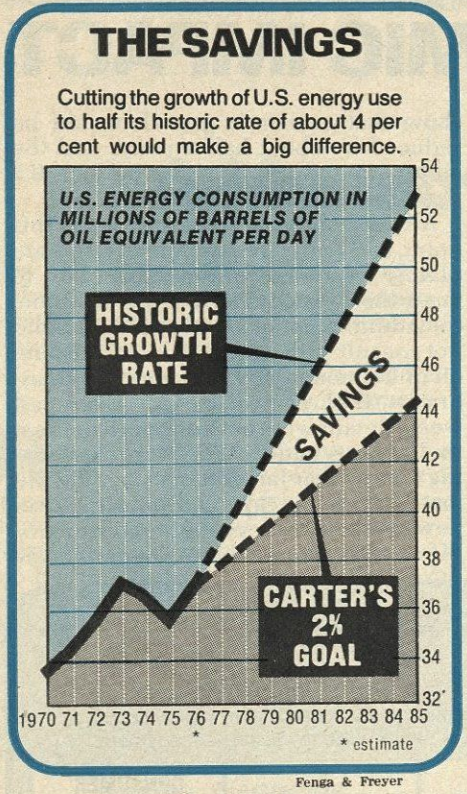
In a way, the Lewises felt victimized. True, as a family they hadn't exactly been model energy conservers. But four years of sharply rising energy prices had taught them something. They had long since turned their thermostat down, and had gotten used to running their air conditioners only on the hottest days. Jennifer had been persuaded to limit the use of her 1,000-watt blow-drier to a maximum of three times a week and Reed had been greeted with a firm parental no when he requested a gasoline-powered Moped to replace his boy-powered bicycle.

In addition, the Lewises had cut back their driving as much as they thought possible. Was it Ron's fault that, lacking adequate public transportation, he was forced to commute the 40 miles to and from his job each day by car? Lately, he had been trying to double or triple up with friends. But such ad hoc car pooling was a hit-or-miss proposition—mostly miss. And how could Jean give up her car? She needed it, not just to get to work, but also to ferry the kids around and do the shopping. She planned her trips more carefully now, making a point of stopping at the A&P in nearby Birmingham on her way home from the office instead of taking the car out again after she got home. Still, there were limits; a suburb was a suburb, and there didn't seem to be any way for the Lewises to drive less than 15,000 miles a year.

SOMETHING SIMPLER

The thought of moving closer to Detroit—perhaps even into the city itself—had occurred to both of them. But that seemed a rather drastic step, just to save energy. There must be something simpler they could do. One obvious step was to get their house properly insulated. They had been putting it off for years, intimidated by contractors' estimates which put the cost at about $1,000. Though they didn't have that kind of cash lying around, both Consumers Power Co., the local natural-gas supplier, and Detroit Edison were offering low-interest loans to finance such projects—and

Goldman Sachs Seminar May 1977
Background docs [illegible] traffic projections



THE SAVINGS

Cutting the growth of U.S. energy use to half its historic rate of about 4 per cent would make a big difference.

Fenga & Freyer

reward some industries and punish others. Insulation manufacturers and housing contractors will be obvious winners. Some railroads can expect a boomlet from the new emphasis on coal production, and the heavy-construction industry can be expected to surge as utilities and factories convert to coal-fired plants.

But there would be big losers as well. By one estimate, Carter's tough approach to Detroit could reduce domestic auto sales by 300,000 units over three years (page 29). Energy-intensive industries—chemicals, paper and glass—would suffer from sharply higher fuel costs and flat tax penalties if they didn't convert from oil and natural gas to coal. Utilities would be hardest hit of all: faced with mandatory conversion to coal by 1990, their capital expenditures would surely run to the tens of billions of dollars. Weighing the odds, investors were clearly expecting more losers than winners: the Dow Jones industrial average sagged to a 20-point loss for the week.

AN AMERICAN OPEC?

Tax credits for shifting to coal will cushion the impact on industry and utilities—but in the end, businessmen will pass along to their customers whatever costs aren't recouped. And the inflationary impact of Carter's energy program is bound to show up in numerous other ways as well. Oil not only fuels electrical power plants and automobiles, it also is used as a raw material in everything from plastics to clothing. Because of the big tax on crude oil at the wellhead, price increases will ripple through the economy, with profits added at each step. In just three years, oil from wells in production before 1973—about 50 per cent of current U.S. output—would triple in price, from $5.17 a barrel today to the expected world price of $15. "We are imposing about 15 per cent of the 1973 OPEC oil price increase upon ourselves," says economist Arthur Okun of the Brookings Institution, "and that just has to show up in prices."

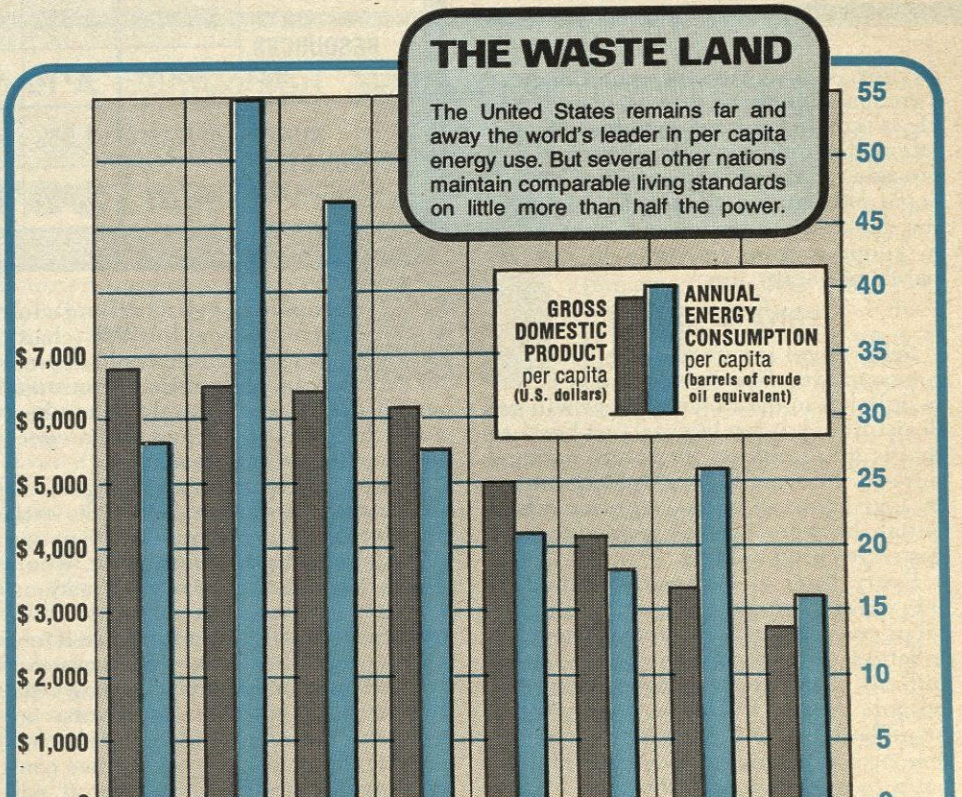
If it does, it could set off something of a chain reaction. Many labor contracts have cost-of-living provisions that are automatically triggered by a jump in the consumer price index. And social-security payments are also linked to the CPI. Administration economists labored hard to figure out if the link could somehow be severed. One option: instead of returning the tax money to consumers, it could be given to states that lower their sales tax—an important component in the CPI. But not every state has a sales tax, and the governors sounded out by the White House rejected the idea. In the end, so did Carter.

More broadly, some businessmen worry that the conservation program may work too well. Carter is trying to reduce the growth rate in energy consumption from the historic 4 per cent a year to 2 per cent or less, which would ultimately save the equivalent of 8.5 million barrels of oil a day (chart). But it could also hurt economic growth. "I don't see how you can have the 6 per cent economic growth rate over the next four years that the Administration talks about if you cut back on growth in energy," says chairman Rawleigh Warner Jr. of Mobil Oil Corp. "How can you achieve both objectives in the same time frame?"

Carter's deadline is actually 1985, but many economists think Warner has a solid point nonetheless. Since World War II, U.S. economic output and energy consumption have grown almost in lockstep—and a sharp cutback in one seems bound to affect the other. Harvard economist Dale W. Jorgenson agrees that the President's program would reduce GNP growth. But Jorgenson believes the alternative is worse: without a "use less, pay more" policy, he argues, the depletion of increasingly scarce supplies would drive fuel prices even higher, thus cutting even deeper into growth.

LESSONS FROM EUROPE

Other experts are more optimistic that a high rate of economic growth can be achieved with a much lower rate of energy consumption (NEWSWEEK, April 18). Most industrialized nations manage to maintain standards of living roughly comparable to the U.S. on much less per capita energy consumption (chart). One reason, however, is a significant difference in life-style, which cannot be easily duplicated in the U.S. In Europe and Japan, for example, where population density is high and suburban sprawl limited, mass transit is more feasible. But energy prices are also considerably higher—and that has put a premium on small cars and conservation-oriented equipment. In West Germany, for example, 29 per cent of all electricity is supplied through "cogeneration," the use of industry's waste heat to drive power plants. As energy prices rise in the U.S., many of



THE WASTE LAND

The United States remains far and away the world's leader in per capita energy use. But several other nations maintain comparable living standards on little more than half the power.

Source: United Nations Statistical Yearbook, data for 1974

Fenga & Freyer

tion is the same whether a higher price is produced by taxes or by simply letting the market price rise. But the incentive to produce is clearly greater if the seller gets the higher price than if the government does. Here again, the President proposes to substitute the bureaucrat for the market: he will decide which components of production should be encouraged, which discouraged.

WRONG TREATMENT

The Carter proposal is a monstrosity. Its end result would be less energy and more wasteful use of energy. The consumer would pay higher costs—directly and through taxes—than in a free market. Producers of all products would be forced to use energy inefficiently, reducing our over-all productivity. This is a prescription for stagnation.

James Schlesinger is a highly trained and intelligent economist. He knows better. How can he have produced such a proposal? The answer seems simple. Politics has taken precedence over economics. To propose the right answer—eliminating government controls and letting the free market work—would render unnecessary the agency that he is destined to head!

Do we really want, does President Carter really want, to turn the production and distribution of energy over to the same people who run the Postal Service and Amtrak?

---

adviser, is correct to urge upon Congress a gradual increase in the cost of gasoline. He is right to envisage a gradual deregulation of natural gas. After the emotional crusade for energy conservation has become old hat, we shall definitely need the day-to-day pressure of higher prices to keep us from reverting to our old habits of energy use.

PRIVATE CHOICE

Schlesinger is a good micro- and macro-economist. His shrewd guess is that people left to their own devices will not desist from buying big cars just because that is inimicable to the future national interest. So it will be useful to contrive by legislation an enhanced price differential between gas-economizing and gas-consuming models.

Every facet of economics is brought into play by the energy program. Higher oil prices will add to the immediate price inflation. But absorption of some extra billions of dollars from consumers' disposable income by dearer energy could be deflationary and growth reducing unless it were properly offset by fiscal rebates or monetary stimulus.

Achieving the Carter program will raise as many problems as failing to achieve it. But they are manageable problems, in a good cause.

THE ECONOMIC IMPACT

At first, the President's men said his energy program would have "generally positive impacts on the economy." A day later, like scores of economists across the country, they conceded that it might hurt—a little. But the general verdict was that whatever it cost would be worth it. "Some moderate economic damage is inevitable," said Otto Eckstein, former economic adviser to Lyndon Johnson and now head of Data Resources, Inc. "But without an energy program, the dislocations and lost economic growth would be far worse."

Precise calculations of the damage are impossible, but economists who have cranked the plan into their computers figure the nation's underlying inflation rate would increase between a half and a full percentage point a year by 1980 (chart). The higher prices, in turn, could depress the economy by undermining consumer purchasing power—exactly what happened following the huge OPEC price increase nearly four years ago.

Aware of the recessionary dangers, the Administration wants to return the extra taxes it collects to consumers. That, says a top Administration economist, would reduce the effect on the gross national product and unemployment to little more than "a wash." Carter himself took that view public. "The most conservative and unfavorable analysis shows that [the program] will have no adverse impact," the President said at his televised news conference last week. "Some computer-model studies show that it will increase the number of jobs by several hundred thousand and have a beneficial effect on our economy." But private economists aren't so sure. Their models show that economic growth would be reduced by about half a point, and the jobless rate would be rising perhaps 0.2 per cent annually by 1980.

All projections are just guesses at this point, and Carter's economic advisers are plainly frustrated. In the crash effort to meet the President's April 20 deadline, the Administration's energy planners did not consult with top officials at the Council of Economic Advisers and the Treasury until three weeks ago. Even last week, details were not firm, and experts at the Treasury and the CEA were challenging energy czar James Schlesinger's estimates of the tax take and puzzling over how to rebate the revenues to consumers. "If you don't know what major parts of the program actually are, how can you evaluate the economic or tax impact?" asked one CEA official.

REVISING THE FORECASTS

How would the Carter energy program affect the economy? Running it through their computers, three econometric forecasting organizations found slightly higher prices and slower growth than would otherwise occur, but no big change in unemployment.

		GROWTH RATE		UNEMPLOYMENT		CONSUMER PRICE INDEX	
		1978	1980	1978	1980	1978	1980
THE WHARTON SCHOOL	*BEFORE*	6.2%	2.5%	6.0%	5.9%	7.0%	6.7%
	AFTER	6.1%	2.3%	6.0%	6.1%	7.5%	7.1%
DATA RESOURCES, INC.	*BEFORE*	5.3%	4.3%	6.4%	5.7%	5.4%	5.4%
	AFTER	5.1%	4.1%	6.5%	5.9%	5.8%	6.3%
CHASE ECONOMETRIC ASSOCIATES	*BEFORE*	1.9%	5.1%	7.9%	7.3%	6.1%	6.0%
	AFTER	1.8%	4.8%	8.0%	7.6%	6.4%	6.8%

Fenga & Freyer

A BOAT TO BE MISSED

Perhaps more important, some Administration officials are hinting that some of the energy taxes might be used to balance the budget by fiscal 1981 or pay for welfare and tax reform. Otherwise, said budget chief Bert Lance, "you miss an opportunity." Carter also stressed that theme. "We still have to have some flexibility about exactly what we do," he told reporters. "I can't certify today that every nickel of the taxes collected will be refunded to consumers." But if all the taxes are not recycled, many economists fear, the program could become an even stronger brake on the economy.

However the Administration sorts out the "macro-economic" considerations, the program's provisions seem certain to

Goldman Sachs Seminar May 1977
Background depressing traffic projections

By Milton Friedman

A Monstrosity

> **i·at′·ro·gen′·ic** *(of a neurosis or physical disorder)* caused by the diagnosis, manner, or treatment of a physician or surgeon.
>
> —Random House Dictionary of the English Language

How is it that the U.S. survived for nearly two centuries without an energy crisis? Until just a few decades ago, there was no Federal Power Commission; until just a few years ago, there was no Federal Energy Agency, no ERDA or any of the other alphabetic agencies that have been mushrooming on all sides. How did we get along without the heavy hand of Big Brother making sure that energy was produced by the right people, in the right way, and distributed to the chosen recipients?

WRONG DIAGNOSIS

Big Brother will tell you that all American energy history is divided into two parts, 1492 to 1973, and 1973 to 1977, that the physical availability of energy has changed drastically so that we can no longer rely on free markets to organize and allocate energy, that we must radically alter our way of life, and give him the proxy to do it for us.

There is only one respect in which our situation has changed drastically—in the role that Big Brother has come to play. Big Brother is the problem, not the cure.

Our present energy problems began several decades ago when government started to fix the price of natural gas. Artificially low prices for gas sold interstate encouraged consumption and discouraged production. The OPEC cartel—itself partly a product of misguided U.S. Government policy—shocked the world by quadrupling crude-oil prices in the fall of 1973, and the U.S. Government reacted by trying to hold down domestic prices. The result: policies that greatly strengthened the cartel. The U.S. is still in effect paying a subsidy of about $3 for every barrel of oil imported. We are still encouraging wasteful consumption and discouraging domestic production of oil and gas and the development of alternative sources of energy, so that our dependence on OPEC has grown rather than declined. Without our foolish and misdirected energy policies, I believe that the OPEC cartel would by now have collapsed. And it still will despite the best efforts of the U.S. Government to prop it up.

The bureaucratic reaction is predictable: if a little bureaucracy creates problems, more bureaucracy will solve them!

Of course, we need to conserve energy—the incentive to do so has always existed and always been effective, in the form of the cost of energy. If each of us has to pay *directly* the full cost of energy—which is what would happen if government price controls were removed and what did happen before government and OPEC stuck their cotton-picking fingers into the pricing of energy—we would individually have an incentive to dispense with the least valued uses of energy. The full cost must be paid—there is no free lunch. How do we get better results by paying for energy through taxes rather than prices and letting bureaucrats spend our money for us?

President Carter's energy proposal goes part way in the right direction by letting some prices rise, primarily by imposing extra taxes. But that interferes with the other blade of the scissors—production. The incentive for conserva-

---

By Paul A. Samuelson

The Right Direction

President Carter's energy program turned out almost exactly as predicted. Really, given the political realities, he had no other choice. Continuing our do-nothing policies would mean increasing dependence on the power of the oil cartel abroad. Asking for repeal of all price controls on energy, so that the free market would be given the job of rationing scarcity in its remorseless way, had no chance of acceptance by Congress and the American people.

Rome was run on bread and circuses. These days, statesmanship requires rhetoric, price penalties, pecuniary subsidies and outright fiats in strategic proportions that challenge a President's skill in leadership.

Is the Carter program a good one? Future economic historians, I expect, will look back and render the judgment that it was the necessary step in the right direction even though it could be implemented only in part.

The important thing is that our consciousness on energy has been truly elevated. Only idiots and special-interest groups any longer dare say that the energy crisis is a myth dreamed up by the giant oil companies or the Washington bureaucrats.

Even if taxes are not legislated to raise the cost of gasoline, electricity and natural gas to the canny consumer, the bulk of the people will buy and use a bit less of the stuff than would otherwise be the case. Already you can see in the post-1973 statistics that the American people have altered their trend of lavish energy use: beyond the restraining effects of the limited price rises, there seems to have been a *downward shift* of the U.S. demand curves for energy.

PUBLIC WILL

The national debate over the Carter program, whatever its detailed outcome, can be predicted with some confidence to induce a further downward shift in the growth rate of our affluent society's use of gasoline, oil and natural gas. So, if the President does use up some of his popularity in a gallant fight for his program, it will be in a good national cause. (President Kennedy discovered empirically that often when he asked for sacrifices from the people, his political fortunes prospered better than when he proffered tax-cut handouts. Carter's standing at the polls may in the end diverge from the scorecard of his legislative success in achieving the different details of his program.)

Still, mere rhetoric is not enough. It has to be backed up by law and by economics.

A Pearl Harbor disaster can unite the people in a determined war effort. The oil problem is of a different and more insidious type. It is analogous to your need to lose and control weight. If at 30 you overeat a bit, there is no clear-cut penalty tomorrow. One is unable to define a point of disaster or of no return (unless it be the coronary attack at 55, when it is too late). Every expert on the obesity of affluent populations knows how hard it is to motivate people to reduce and stay reduced.

So James Schlesinger, Carter's energy

WHAT IT SAYS—AND WHAT IT MEANS

President Carter's energy strategy includes a combination of penalties and subsidies to reduce consumption. Highlights of the plan:

BIG-CAR TAX: A gas-guzzler tax would be placed on new automobiles that do not meet Federal mileage standards (18 mpg in 1978, 27.5 mpg by 1985). The tax could range from $52 to $449 in 1978 and from $67 to $2,488 in 1985. The money collected would be rebated to consumers who purchase cars that are more efficient than the Federal standards. Rebates would range from $47 to $473 in 1978 and from $62 to $493 in 1985.

Analysis and outlook: *The tax-rebate scheme should be very effective in reducing gasoline consumption—though some conservationists would like to apply it to used cars as well and convert it to an annual levy. One pitfall: Detroit could conceivably negate the plan by lowering the price of big cars and raising the price of compacts. Congress is expected to approve a gas-guzzler tax, though it will have to decide how to deal with foreign cars.*

STAND-BY TAX ON GASOLINE: If gas consumption exceeds Federal targets by 1 per cent or more, a 5-cent-per-gallon tax would be imposed beginning in 1979. The tax would increase 5 cents a gallon every year in which the targets are exceeded—to a maximum of 50 cents.

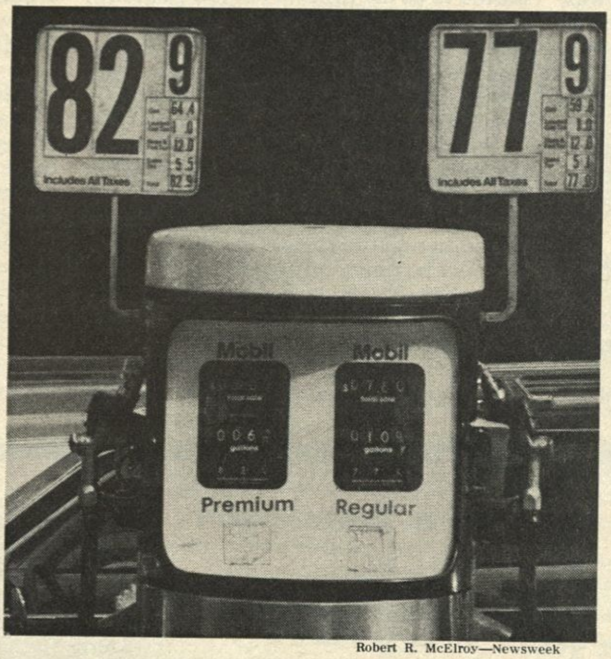
Analysis and outlook: *Critics contend that the gas tax will not induce people to drive less, and that it is regressive because it penalizes the poor and those who must drive to work. A few influential congressmen, including House Ways and Means chairman Al Ullman, will support a gasoline tax. However, its chances look dim, and if it passes, it might be considerably smaller than Carter requested.*

INSULATION CREDITS: Homeowners who install insulation would receive a tax credit of 25 per cent of the first $800 they spend, and 15 per cent of the next $1,400. Businesses would receive a 10 per cent tax credit for similar efforts.

Analysis and outlook: *This proposal is popular with the public and should pass easily. But some experts say manufacturers might not be able to supply enough insulation to meet Carter's goal of retrofitting 90 per cent of American homes by 1985.*

OIL PRICES: Oil produced from wells at 1972 levels ("old" oil) would be taxed so that its price rises from $5.17 a barrel now to the world price of about $15 by 1980. The government would rebate the increase to the public. Newly discovered oil, now $11.28 a barrel, would be permitted to rise to the 1977 world market price over a three-year period. This increase would go to the producer.

Analysis and outlook: *Oil producers complain that the tax on old oil provides no incentive for further production. But the Administration insists that the industry will have enough incentive from the increase in new-oil prices. Although some changes in oil pricing seem inevitable, the Administration must still devise a way to rebate the added cost of home-heating oil to consumers.*



Robert R. McElroy—Newsweek

Gasoline pump in New York: Higher yet

NATURAL-GAS PRICES: The price of newly discovered natural gas sold in regulated interstate markets would be increased from $1.45 per 1,000 cubic feet to $1.75. Gas sold at about $2 in the unregulated intrastate market would be federally regulated and its price reduced to $1.75.

Analysis and outlook: *By equalizing the price of intrastate and interstate gas, the Administration hopes to balance gas distribution and avoid the disastrous shortages that developed last winter. The big battle in Congress will be between those who favor decontrol of natural-gas prices and those who support the ceiling price. It seems possible that the Federal price ceiling may be set higher than the $1.75 Carter has requested.*

UTILITY RATES: Carter would phase out "promotional rates"—utility pricing policies that give discounts to volume users of electricity. Utilities would also be asked to charge higher rates during the day and lower rates at night—thus encouraging users to shift away from peak consumption periods. By evening out the load, utilities would burn fuel more efficiently.

Analysis and outlook: *This proposal would probably mean higher bills for business—costs that would eventually be passed on to consumers. Some far-reaching changes in life-style might result if manufacturing firms put more employees to work at night to take advantage of lower rates. Utilities will lobby heavily against the proposals.*

COAL CONVERSION: Beginning in 1979, industries that have not converted from oil and natural gas to coal would be taxed. (Industries that must use gas, such as fertilizer manufacturers, would be exempt.) Utilities would not be subject to the tax until 1983, because of the longer time it would take them to convert to coal.

Analysis and outlook: *It will be difficult to increase the use of coal 65 per cent by 1985 without degrading air quality. And converting to coal will be expensive for many companies and utilities. Congress seems likely to pass conversion legislation, but environmental standards may ultimately be relaxed somewhat.*

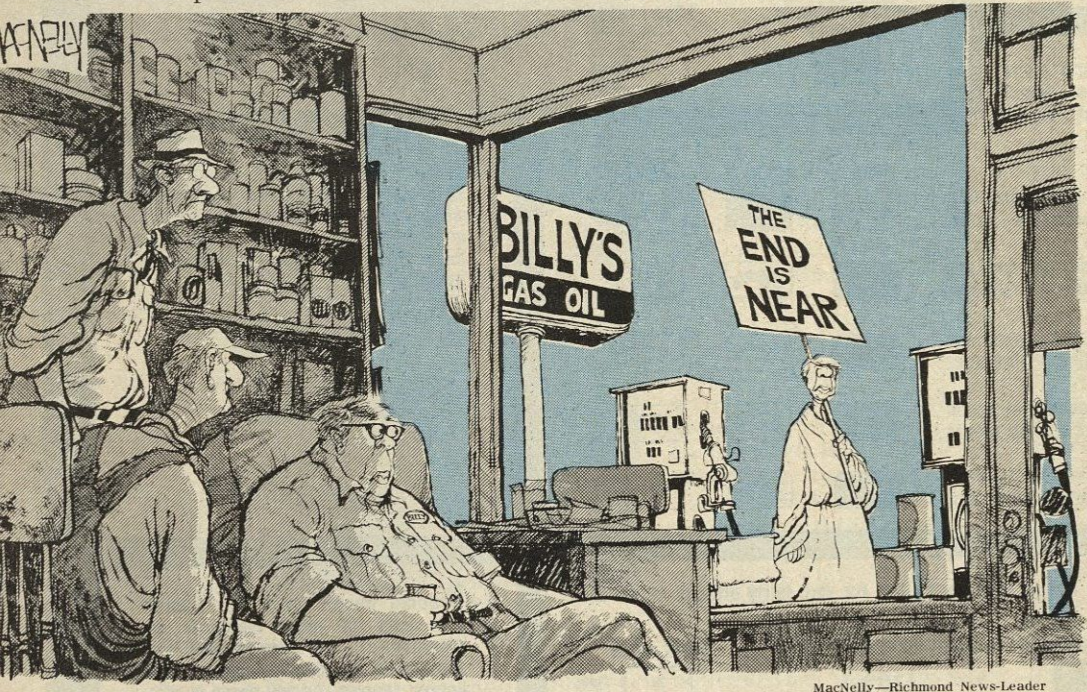
SOLAR ENERGY: Any family that installs solar-heating equipment would receive a tax credit of 40 per cent of the first $1,000 they spend and 25 per cent of the next $6,400, up to a maximum of $2,000. The credit would gradually decline between now and 1985.

Analysis and outlook: *Congress will embrace this proposal. But even with the large tax credits, solar-energy equipment will be expensive and the necessary technology is still in its infancy.*

Newsweek, May 2, 1977

Goldman Sachs Seminar May 1977
Background docs Sullivan traffic projections

with top aide Hamilton Jordan. In jeans and a blue polo shirt, Carter convened a four-hour marathon that night to review the text and details of his plan. Several modifications were made at the urging of cost-conscious staffers from the Office of Management and Budget, and Carter decided not to specify the level of gasoline consumption that would trigger his proposed nickel-a-gallon stand-by tax—because it turned out that his experts could not agree on a reasonable goal. Some aides also argued for the elimination of Carter's arcane reference to "cogeneration"—the process of obtaining additional power from waste steam. "It's going to become part of our vocabulary," replied Carter. "We might as well introduce it." He won the point.



MacNelly—Richmond News-Leader

Turnabout: After the apocalyptic call to arms, the word was, 'Don't worry'

Typically, the President pushed himself even harder than he did his aides. He was back at his desk at 6:20 a.m. after less than five hours' sleep; staffers were given until 10 a.m. to submit one-page memos for the final draft of the energy plan. At 2 p.m. Carter was persuaded to go back to the family quarters for some rest, but he returned to the Oval Office three hours later—suited up and combed down for his Congressional appearance. "I'm not a very good daytime napper," Carter confessed to appointments secretary Tim Kraft. Not surprisingly, Carter made several slips of the tongue as he delivered the energy message from the House rostrum (referring to "miles per hour" instead of "miles per gallon," for example). "I think he was damn worn out," empathized an equally exhausted Jody Powell.

But Carter was back plugging his plan again next day. At a Rose Garden session with visiting students, the President encouraged them to take "a leadership role" in energy conservation by monitoring "what goes on in your schools, in your public buildings . . . in your own home." Staffers, meanwhile, were planning a six-month "sell job," as one aide called it. The campaign would be directed by Jordan aide Mark Siegel and would include a program of "mix and mingle" social sessions for congressmen at the White House and a schedule of appearances by Cabinet members and other top officials around the country.

A SNOWSTORM IN AUGUST

Carter told NEWSWEEK that he himself was ready to fly into any area where serious opposition to his program developed. And where he was already scheduled to appear—including a United Auto Workers convention next month and the Notre Dame commencement as well—"he won't miss an opportunity to remind the public about energy," Congressional aide Moore predicted. Another adviser joked, "On Aug. 1, Jimmy's going to produce a snowstorm. He's going to use some of the connections he's built up over the years."

The Democratic leaders in both houses of Congress had already endorsed the principles and goals of his plan, and they were working to facilitate its passage. "We are going to pass a comprehensive energy program without any doubt," said Washington Sen. Henry Jackson. The process began almost immediately last week when House Speaker Thomas (Tip) O'Neill set up a special energy committee that will handle the plan as a single package once its component parts have passed through the normal committee process.

In this way, the leaders hoped to limit logrolling and trade-offs on the various taxes, rebates and price controls. No special interest in the group would be dominant, explained committee chairman Thomas (Lud) Ashley, whose own home district is heavy with plants making automotive parts and accessories. "Given the broad approach," said Ashley, "I will find it easier to rise above parochial interests. My people will say, 'OK, as long as everybody is hurt equally'."

The 40 committee members were carefully chosen to represent all special-interest groups and regions—with a slight tilt toward consumer interests and against radical changes, such as the total elimination of price controls on gas and oil. But even Carter's Congressional supporters acknowledged that it was the President himself who would play the most important role, taking the political heat for them and putting his own political capital on the line. "The way to a congressman's vote on this one is through his district," said one Capitol Hill veteran. Said Ashley: "The President has to get out and around the country, and do what he did in the early days of his campaign."

PROSPECTS FOR PASSAGE

But many details of the President's program were clearly negotiable, and just how much of the original would be enacted remained to be seen. Though Carter himself said every element was essential, Hill veterans took the package as a starting point for debate and compromise. The stand-by gasoline tax in particular was a lightning rod. "It will draw all the attention away while everything else passes," said one House leader. "By far the most important part of the package is the pricing mechanism on petroleum," said Ways and Means Committee chairman Al Ullman. "That's where the big money is."

Some critics thought Carter could have gone further if he really saw a crisis ahead—launching the equivalent of a new Manhattan Project to develop new sources of energy. Others said he should have taken more time to analyze the impact of the programs he did propose. For all that, the President clearly had moved his Administration from symbolism to substance on a vital national issue. And he seemed to have passed the first political test of his young Administration with his popularity enhanced. Beyond that, Carter had made the first real progress in leading the nation to confront a problem that could ultimately prove its undoing. If he could keep the initiative and the momentum—and if his solution turned out to be in the right direction—his countrymen would have cause to be grateful.

—DAVID M. ALPERN with THOMAS M. DeFRANK, ELEANOR CLIFT and HENRY W. HUBBARD in Washington and bureau reports

A HIT WITH THE PEOPLE

In a special survey conducted for NEWSWEEK, *The Gallup Organization interviewed a national sample of 507 adults to assess the impact of the President's energy proposals. The telephone polling was done last Wednesday night and Thursday after Carter announced his plan to a joint session of Congress.*

1 How serious would you say the energy situation is in the U.S.—very serious, fairly serious, or not at all serious?

VERY SERIOUS	FAIRLY SERIOUS	NOT AT ALL SERIOUS	NO OPINION
54%	36%	7%	3%

2 Did you happen to see President Carter's Monday-night broadcast to the nation on energy?

YES	NO
51%	49%

3 Did you happen to see President Carter's Wednesday-night broadcast describing his energy proposals?

YES	NO
55%	45%

4 Has Carter's handling of the energy problem made you more favorably disposed to him or less favorably disposed, or has it made no difference at all?

MORE FAVORABLY DISPOSED	LESS FAVORABLY DISPOSED	NO DIFFERENCE	DON'T KNOW
40%	13%	39%	8%

5 As you know, President Carter's plans will have to be approved by Congress. Would you like your congressman to vote for or against the following proposals:

	FOR	AGAINST	DON'T KNOW
An increase in the tax on gasoline with a provision for income tax rebates	45%	47%	8%
A tax of up to $2,500 on new big cars and a rebate of up to $500 on small cars	54%	38%	8%
A tax credit of up to $410 to encourage homeowners to insulate their homes	84%	12%	4%
The plan to encourage construction of more nuclear plants	56%	27%	17%
A tax credit of up to $2,000 to families that install solar energy equipment	63%	24%	13%

6 Do you think the nation's economy would suffer if Carter's package is adopted? Would you say it would be likely the economy would suffer, or unlikely?

LIKELY	64%
UNLIKELY	26%
DON'T KNOW	10%

7 Would paying higher prices for energy be very difficult for you, fairly difficult or not too difficult?

VERY DIFFICULT	FAIRLY DIFFICULT	NOT TOO DIFFICULT	DON'T KNOW
43%	39%	18%	*

*less than .5%

8 Do you think the Carter plans would cause you to make a lot of changes in the way you live, some changes or not very many changes?

A LOT OF CHANGES	SOME CHANGES	NOT VERY MANY CHANGES	DON'T KNOW
21%	49%	28%	2%

9 Some people think the Carter plan puts too much emphasis on conservation of energy and not enough on the development of new energy sources. Do you agree or disagree with this opinion?

AGREE	59%
DISAGREE	30%
DON'T KNOW	11%

10 Under the Carter proposal to increase gasoline taxes do you think you would cut back your driving a lot, some, not very much or not at all?

A LOT	12%
SOME	40%
NOT VERY MUCH	17%
NOT AT ALL	25%
DON'T KNOW	6%

11 Do you think that the plan to tax big cars would result in significantly fewer big cars being sold or do you think those who want big cars will pay the higher prices?

FEWER SOLD	PAY HIGHER PRICES	DON'T KNOW
26%	69%	5%

12 Do you think that the burden of Carter's energy program would fall more heavily on you and your family compared with most Americans, about the same or less heavily than on most Americans?

MORE HEAVILY	ABOUT THE SAME	LESS HEAVILY	DON'T KNOW
25%	61%	11%	3%

Fenga & Freyer

Goldman Sach Seminar May 1977

Photos by Wally McNamee—Newsweek

Pondering options: The moral equivalent of war?

gas-guzzling cars. But consumers would get back just about all their energy taxes through a complex system of rebates particularly aimed at motorists who buy small cars and families who insulate their homes.

AN ATMOSPHERE OF SACRIFICE

The biggest burden will probably fall on industry. Factories and utilities will be taxed heavily unless they shift to coal. Appliance manufacturers will have to meet strict new efficiency standards, while the automakers may well have some trouble selling their highly profitable big cars. "The people who really get hurt are the special interests," a White House aide said later. But generating an atmosphere of common sacrifice was deemed vital to mobilize popular support against the inevitable opposition of key industries. "I haven't tried to paint special interests into a corner. I have tried . . . to get the American people on my side," Carter told NEWSWEEK in an exclusive interview (page 36). "And it's been very encouraging to me that the [special interests] have not come out and said this is a bad, ill-advised program. They've been very reticent with their criticisms."

Judging by the NEWSWEEK poll, Carter's program had indeed gotten off to a good start at the grass roots. A majority of those interviewed were favorably disposed toward the President's energy package even though more than 80 per cent felt it would result in personal financial hardship—and 64 per cent thought it likely that the nation's economy would suffer.

As Carter had hoped, a solid majority (54 per cent) now believes that the energy crisis is very serious—compared with only 43 per cent a fortnight ago. The public also appreciated the element of fairness and shared suffering that the President stressed in his plan. A majority of those sampled (61 per cent) believed that the program would fall no more heavily on them than on most Americans—and that was the majority view in all regions of the country and among all income groups.

Many people, however, weren't sure that Carter's proposals would work or change their lives much. Almost three in ten of those questioned, for example, did not believe there would be many changes in the way they lived. Only 12 per cent said that a stand-by gasoline tax would prompt them to cut back their driving a lot, and 69 per cent believed that Americans who want big cars would buy them despite Carter's proposed tax on gas guzzlers. Moreover, a majority (59 per cent) agreed with the criticism that Carter placed too much emphasis on conservation and not enough on development of new energy supplies. Yet 40 per cent of those interviewed said Carter's handling of the energy problem made them more favorably disposed to the President over-all—as against only 13 per cent who felt less favorably disposed.

For Carter, the public reaction capped weeks of preparation that continued up to the last minute. On the eve of his first TV address last week, drafted by speechwriter James Fallows, the President was particularly concerned with tone and nuance. In a two-hour meeting with his closest advisers—including media consultant Gerald Rafshoon and pollster Pat Caddell—the President played a rehearsal tape of his talk and then welcomed what one source called a line-by-line "battle over adjectives." He refused to part with "the moral equivalent of war," the celebrated phrase of William James that was penciled in at the request of energy adviser James Schlesinger. But Carter did agree to drop the notion that Americans would be "cowardly" not to face up to their energy problem. "There was a widespread feeling it was too rough," said one participant.

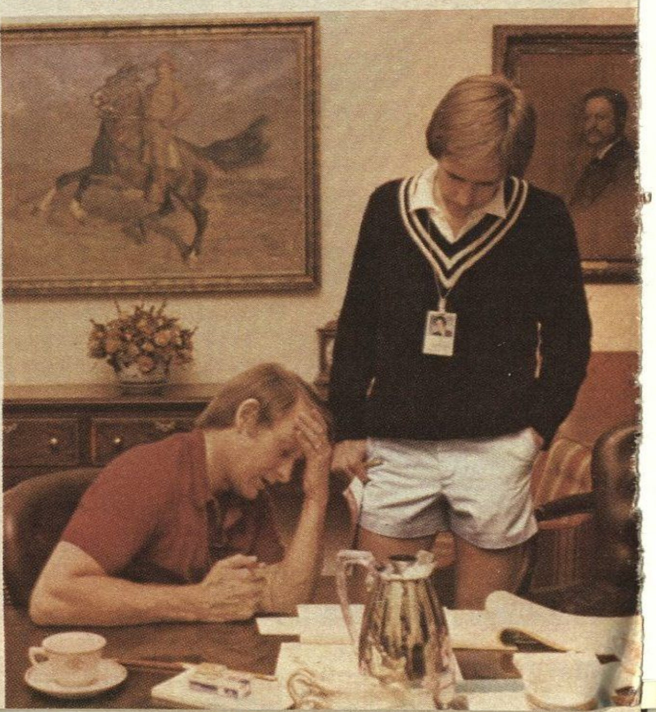
A LITTLE LAUGHTER

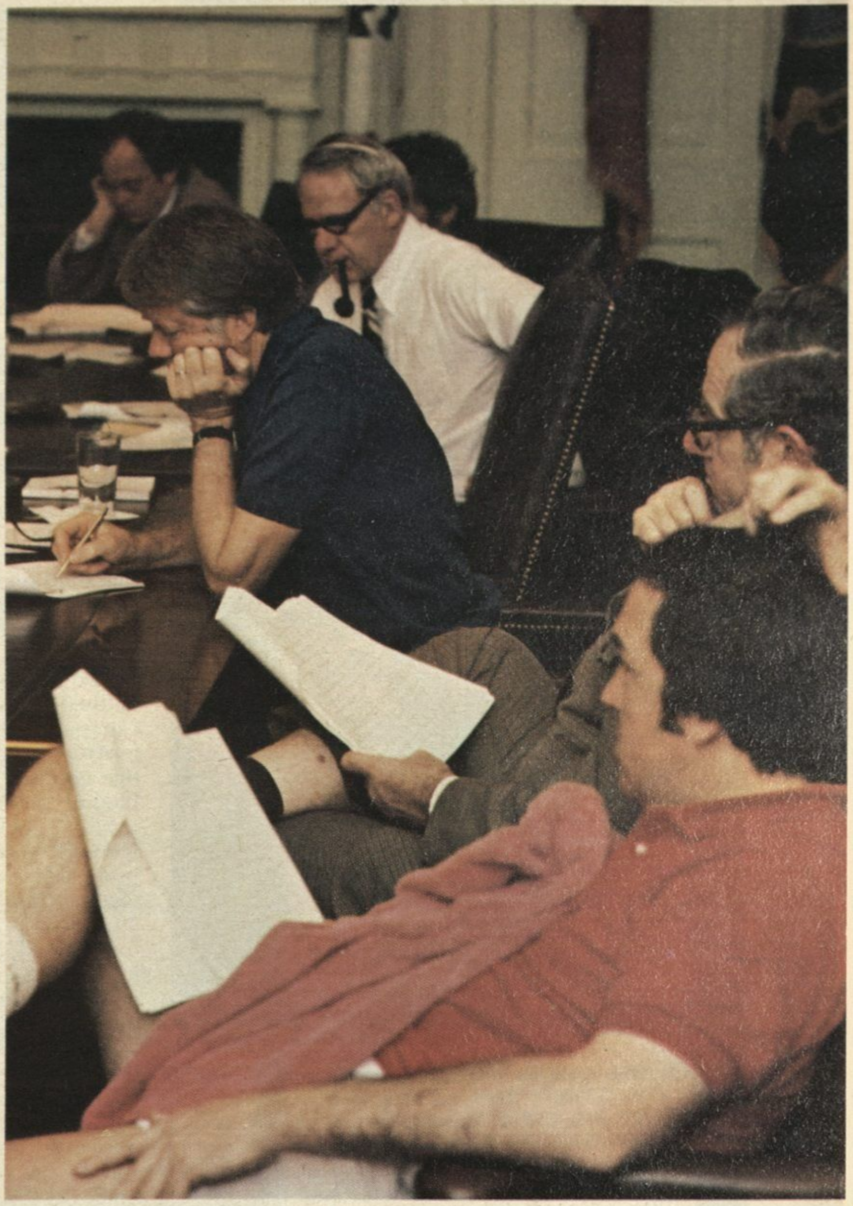
When First Lady Rosalynn returned from Camp David to surprise the President, much hugging and kissing ensued and Carter invited her to join the discussion. She kept asking that the speech be simplified, only to be rebuffed by Schlesinger. "Every once in a while," reports Rafshoon, "she'd say, 'Maybe I ought to get out of here.' But Jimmy would say no." At one point the President added some laughter to the meeting's serious tone by reading an aide's proposed ending for his speech: "Let us look towards the Tricentennial when all of us will be gone from the earth . . . " Carter shook his head. "Boy," he said, "that really sounds appealing."

Carter and the others reluctantly agreed to a suggestion by Schlesinger and domestic adviser Stuart Eizenstat that some graphics be used to dramatize dwindling fuel supplies. But after seeing the chart that was prepared next day, Rafshoon promptly vetoed it. "Distracting," he said. "Jimmy's best when other elements don't get in the way."

After the speech, Carter accepted the favorable reviews of his staff (some of whom had thought his performance rather "wooden" at the start), then watched the instant analysis on TV with Rosalynn, Chip and Caron Carter. Next day, he was back at work on his address to the joint session, with time out for tennis

Powell (left) and Fallows: The crucial adjectives





Photos by Wally McNamee—Newsweek

Seizing the initiative: After a grim warning to the nation from the Oval Office, Carter held marathon sessions on his Congressional message—with brief sets of tennis with Jordan. Schlesinger briefed congressmen about the problem and the President's plans.

FREE WORLD OIL
Prospective Demand

Information Letter

No. 2217, April 27, 1977

WILLIAM H. DEMPSEY
President

ASSOCIATION OF AMERICAN RAILROADS
AMERICAN RAILROADS BUILDING, WASHINGTON, D. C. 20036

JET
Info
7 5/5

Goldman Sach Seminar May 1977

Energy Policy Calls for More Coal Use

WASHINGTON – President Carter has told Congress and the nation that "we must be sure that oil and natural gas are not wasted by industries that could use coal," and called for conversion from scarce fuels to coal "wherever possible."

His energy message included a call for increased coal production by two-thirds, to over one billion tons a year, as well as for conservation of petroleum.

Although coal now provides only 18 percent of the nation's total energy needs, it makes up 90 percent of energy reserves, Mr. Carter said. Production and use of coal "do create environmental difficulties," he said, "but I believe that we can cope with them through strict strip-mining and clean air standards."

Noting that the railroads are the largest provider of intercity freight transportation, William H. Dempsey, AAR president, pointed out that they "have long been recognized as the most fuel efficient and environmentally sound form of transportation for most volume movements over extended distances. The railroads stand ready to handle increasing amounts of freight to assist the nation in reducing its petroleum consumption."

In order to achieve the proposed increase in use of coal, the President suggested a sliding scale tax, starting in 1979, on large industrial users of oil and natural gas. Utilities would not be subject to the tax until 1983, he said, "because it will simply take them longer to convert to coal." Manufacturers of fertilizer and similar products who do not use gas will be exempt from the tax.

The President also said he will submit proposals for expanded research and development in coal. He noted a need "to find better ways to mine it safely and to burn it cleanly, and to use it to produce other clean energy sources like liquified and gasified

(Continued on Page 4)

Waterway Subsidy Policies, Programs Rapped

WASHINGTON – Policies and programs providing and maintaining free rights-of-way for water carriers "have the net effect of providing perhaps fifty cents of taxpayer money to match each dollar paid by those who ship by waterway," according to AAR President William H. Dempsey, in testimony presented before the Senate Environment and Public Works Subcommittee on Water Resources.

Mr. Dempsey pointed out that the waterway subsidy "currently robs the railroads of hundreds of millions of dollars per year in net revenue," Mr. Dempsey explained, "That is money which the railroads do not have to maintain and modernize their plant. That is money whose benefits railroad shippers do not enjoy." He also stated that it is money which Congress may ultimately have to provide "to undo the physical and financial havoc wreaked upon our railroad system by policies which advantage the few at the expense of many."

Mr. Dempsey urged the committee to adopt a "proper system of user charges on the inland waterways" that would "eliminate some of the competitive inequities in the present system" and would "assist in dealing with the difficult and controversial decisions that must be made on any improvements and additions to the inland waterways system."

Pointing to nearly $6 billion the Corps of Engineers has spent in the last eleven years to operate, maintain and construct the inland waterway system, Mr. Dempsey charged "the direct beneficiaries of these Federal expenditures pay none of that public cost."

"In contrast," he explained, "freight-carrying railroads are expected to own, maintain, improve and operate all of their own rights-of-way and to

(Continued on Page 4)

Amtrak Sets Changes In 60 Train Schedules

WASHINGTON – Amtrak has changed schedules on some 60 trains, including changes on most of its long-distance trains serving the midwest.

Amtrak officials said new train times were caused "by a speed-up in some schedules, increased running times on others" and schedule revisions to allow connections in Ogden, Utah, with the Pioneer, a new train that is to begin operating on June 7 between Salt Lake City and Seattle.

Significant changes were made to schedules of the Broadway Limited, the National Limited, the Empire Builder, the North Coast Hiawatha, the San Francisco Zephyr and one of the corporation's Chicago-Milwaukee trains.

Lesser schedule changes were made on other trains, including the Sunset Limited, the Inter-American, the Lone Star, the Lake Shore Limited, the Panama Limited and on most short-distance trains radiating out from Chicago.

Coal Transportation Forum Set by American University

WASHINGTON – A conference on transportation of coal and other resources and ways of meeting energy requirements through the 1980s will be held here May 24-26 under the sponsorship of The American University.

Edward Margolin, director of the University's Center for Transportation Studies, said the program will focus on such areas as major energy demands, sources and transportation availabilities. The ability of the railroads and other carriers to handle increased coal production and meet utility and other requirements will be examined along with regional aspects of coal production and consumption. Environmental, social and financial costs for the nation's transportation system to meet increasing energy transportation demands are to be considered.

Speakers at the three-day session will include A. Daniel O'Neal, ICC chairman; John P. Fishwick, president of the Norfolk and Western; John D. Hertog, vice president of operations for the Burlington Northern; Walter W. Simpson, vice president of engineering for the Southern; Dr. James Constantino, director of the Department of Transportation Systems Center; Richard E. Briggs, AAR vice president of economics and public affairs, and Carl Bagge, president of the National Coal Association.

RPI Urges Congress To OK Budget Proposals of FRA

WASHINGTON – Congress has been urged to give the Federal Railroad Administration $275 million for redeemable preference share financing to help upgrade railroad freight line plant and equipment.

In a statement submitted to the House Appropriations Subcommittee on Transportation and Related Agencies, Nils A. Lennartson, president of the Railway Progress Institute, also called for $400 million to be used in the rehabilitation of facilities to improve passenger service in the Northeast Corridor between here and Boston.

Equally important, Mr. Lennartson said, are FRA requests for $57 million for research and development and $20.6 million for safety projects.

In a separate statement, Mr. Lennartson expressed RPI's support for the budget requests submitted by Amtrak and the Urban Mass Transportation Administration. He told the Subcommittee that the requested funds are important to energy conservation and air polution control.

The RPI statement emphasized support for the $316.8 million capital funding requests by Amtrak under its original five-year budget projection and a proposal for $1.35 billion by UMTA.

Clapp Reelected ICC Vice Chairman

WASHINGTON – Charles L. Clapp has been reelected vice chairman of the Interstate Commerce Commission for the remainder of this year.

Mr. Clapp was first elected vice chairman in December 1975 to serve for the following year. He has been a member of the ICC since March 1974 and his term is to expire at the end of 1980.

Freight Boxscore

Weeks Ended April 9 and April 16

	1977	1976	% Change
Cars Loaded			
(4/9)	424,673	463,555	-8.4
(4/16)	471,603	448,271	+5.2
Ton-mileage (billions)			
(4/9)	14.7	15.4	-4.5
(4/16)	16.2	14.9	+9.3
Year to date	230.0	225.3	+2.0

Industry's Coal-Handling Ability Cited

Railroad Leaders Agree in Separate Remarks

"Bright Promise" Is Seen In Capitol Hill Testimony

WASHINGTON – Railroads can handle even the largest of coal production increases and the prospect "holds bright promise," William H. Dempsey, AAR president, told Congress.

In testimony prepared for a joint session of the Mines and Mining and the Indian Affairs and Public Lands subcommittees of the House Committee on Interior and Insular Affairs, Mr. Dempsey stated the railroad industry's opposition to the Coal Pipeline Act of 1977 – a measure which would grant the Federal right of eminent domain to builders of coal slurry pipelines.

If significant amounts of new coal traffic are to be tied up in long-term contracts with coal slurry pipelines, the AAR president warned, the potential for growth throughout the industry may never be realized and many railroads would be hard-pressed to raise their earnings to adequate levels.

Also testifying were Louis W. Menk, chairman of the Burlington Northern; Hays T. Watkins, chairman and president of the Chessie System, and James R. Wolfe, president of the Chicago and North Western.

Mr. Dempsey called it "paradoxical" that enactment of the Railroad Revitalization and Regulatory Reform Act of 1976 – aimed at improving and revitalizing the nation's rail system – should be immediately followed by consideration of a measure which would make that revitalization all the more difficult and costly.

Alluding to allegations that railroads cannot handle the coal that will be produced in the coming decade, he declared, "I welcome the opportunity to state unequivocally that this premise simply is not true."

Mr. Dempsey cited three independent government reports which support his position. "Based on these reports alone," he asserted, "one would do well to accept the fact that the nation's railroads have the necessary capacity."

The railroad industry spokesman explained that President Carter's energy goal of a two-thirds increase in annual coal production by 1985 would require only about an 8 percent average annual increase over the 1977 coal production estimate – which would mean a total rail traffic growth rate of less than 3 percent per year.

"By way of comparison," he stated, "the railroads handled a 5 percent increase in traffic in 1972 and an unexpected 10 percent gain the next year for two all-time traffic records."

Rather than lack of capability, the railroads have faced the problem in recent years of having huge amounts of unused plant capacity, the AAR president reminded the subcommittees.

"That unused capacity may now prove a blessing," he averred, "because it was built or acquired at a cost far lower than would be possible today."

The only question with regard to railroads being able to finance the coal expansion relates to H. R. 1609, the coal pipeline act, he cautioned.

"If the Federal power of eminent domain is not granted to coal slurry pipeline builders, then it will be safe to assume that the railroads will obtain this desirable and profitable new business," he explained. "If the power is granted, if the pipelines are constructed, then it will be assumed that some of the most lucrative portions of the coal traffic will be denied to the railroads."

Chessie Chief Tells Press Of Coal-Moving Capacity

BALTIMORE – The nation's railroads "have the capacity and can be ready to move" all the coal that would be mined if the goals set in President Carter's energy plans are met, Hays T. Watkins, chairman and president of the Chessie System said here.

The President has called for a two-thirds increase in coal production by 1985 – a rise that would boost production by some 400 million tons annually.

In a news conference following the Chessie's annual stockholders meeting here, Mr. Watkins said, in reference to President Carter's energy message, that "one thing comes through loud and clear and that is that this nation has to depend on coal for its energy."

Coal hopper cars, locomotives and related coal-hauling facilities can be constructed in less time than it takes to bring new mines into production, Mr. Watkins pointed out, noting that it generally takes about four years for a new mine to reach capacity production.

Major Rail Restructuring "Very Likely" in Midwest

WASHINGTON – The "condition of several Midwest railroads suggests that major restructuring . . . is very likely," and the Interstate Commerce Commission "should be in a position to take swift and positive action based on predetermined policies" should a major carrier become unable to sustain operations, according to a paper issued by the ICC's Rail Services Planning Office (RSPO).

The report further stated that "incentives contained in" the Railroad Revitalization and Regulatory Reform Act of 1976 "are insufficient" because of "the lack of progress toward consolidation since passage" of the Act. RSPO said its study "will undertake to identify incentives necessary to generate desirable consolidation proposals."

The paper was RSPO's initial effort in its railroad merger and consolidation study, in which it will review advantages and disadvantages of such arrangements, attempt to identify major problems involved and propose solutions to such problems. Results of the study, RSPO said, "are expected to permit the Commission to develop criteria which can be applied in determining if carrier consolidation proposals are in the public interest."

RSPO added that, "in the absence of express authority to enforce consolidations, government policy efforts in the rail area should be limited to defining public policy objectives and national transportation needs and the initiation of merger and consolidation proposals should be left to the railroads."

President's Energy Program Calls for More Use of Coal

(Continued from Page 1)

coal. We have already spent billions of dollars on research and development on nuclear power, but very little on coal. Investments here can pay rich dividends."

In an earlier address on national television, the President urged fast action in dealing with the energy crisis, adding that if there is a delay, too few utilities will have switched to coal.

In turn, the President said, "we will not be ready to keep our transportation system running with smaller, more efficient cars and a better network of buses, trains and public transportation."

President Asks Congress To Kill 18 Water Projects

WASHINGTON – President Carter has recommended to Congress that 18 of 32 water projects under review be killed and five others should be cut back, saving a total of some $4 billion.

Among the larger projects that survived the President's proposed cut-back were the $1.6 billion Tennessee-Tombigbee Waterway and the $1.3 billion Central Arizona project. The former is a proposed 253-mile canal that would link the Tennessee River with the Gulf of Mexico, while the latter would bring major water supplies to Phoenix and Tucson and irrigate land in those areas.

In making his recommendations, President Carter said he intends to develop stiffer cost-benefit tests for any future projects and create policies to ensure that the beneficiaries of federal water projects pay more of the construction and maintenance costs.

Waterway Subsidy Policies, Programs Are Criticized

(Continued from Page 1)

cover the cost" out of the freight charges paid by rail shippers. The cost of owning and maintaining railroad fixed plant amounted to $4.4 billion in 1974.

More than forty years of independent studies have stressed the inequity of an arrangement where railroads bear an enormous cost on behalf of their shippers "and the waterway operators bear none on behalf of theirs," Mr. Dempsey said.

Mr. Dempsey stated his belief that Federal policy and programs should lead to a market in which all of the modes compete on equal terms and in which market shares are determined by shipper preference based upon service and upon rates which cover all of the economic and social costs of providing the service. "We find no logic," he said, "in a public policy which requires the taxpayers on the one hand and railroad shippers on the other to provide massive subsidy to the select shippers who are able to use the waterways."

Family Lines Orders New Box Cars

JACKSONVILLE, Fla. – The Family Lines System has ordered 340 new box cars at a cost of more than $12.5 million. Delivery of the new cars is scheduled to start in July.

Included are orders for 40 specialized box cars designed for hauling appliances, 100 high-roof cars used primarily for transporting paper products, and 200 high cubic capacity general service box cars.

JET
info-
pls note & return
EWW
4-4

BLACK & VEATCH
CONSULTING ENGINEERS

1500 MEADOW LAKE PARKWAY
KANSAS CITY, MISSOURI 64114

ADDRESS REPLY TO
12075 EAST 45TH AVE., SUITE 333
DENVER, COLORADO 80239
AREA CODE 303 · TEL. 371-1120

March 31, 1977

Mr. E. W. Wotipka
Denver & Rio Grande Western Railway
1515 Arapahoe Street
Denver, Colorado 80202

Dear Bill:

Enclosed please find a copy of the article in the January "Coal Age" that we discussed today. I believe that this is as unbiased a report as has been published to date.

Incidentally, I have just found out that the legal right of eminent domain in the State of Texas has passed both houses. It is now in a joint committee for resolution of differences before sending to the Governor for his signature.

Thank you again for the information you furnished.

Sincerely,

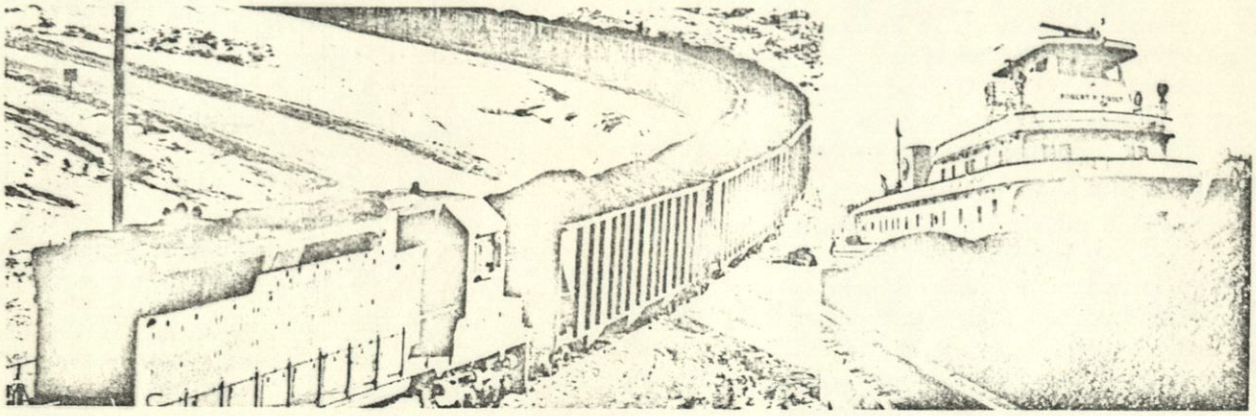
Vern

Vern Winkel

ehh
Enclosure

COAL AGE

Devoted to the operating, technical and business problems of the coal-mining industry



Coal transporters face challenge

Transporting the vast quantities of coal projected for production by 1985 (1.2 billion tpy) looms as one of the most difficult challenges facing the nation, especially in the West, as the demand for low-sulfur reserves increases.

In the past five years, numerous studies have been conducted on the movement of coal by all modes of transportation. Concern for the environment is a large factor, but political, economic, social and technological forces bearing upon the long-term US energy outlook also must be dealt with. Probably the most important question to be answered is whether or not the railroads can meet the challenge ahead.

Currently, all rail movements account for 49% of coal shipments, while river movements take 18%, trucks 12%, conveyors 8%, Great Lakes shipments 7% and tidewater shipments 1%, according to a US Bureau of Mines study. The remainder is unreported. The Bureau estimates the shares will remain roughly the same through 1985, but rails will edge up as more unit trains come into service.

The Bureau study on coal transportation practices and equipment requirements to 1985 concludes that the railroads would require four times more hopper cars than currently in use if they did not improve efficiency, and barge requirements could increase by 50% or more.

However, the study says that the best possible efficiency would mean the railroads could actually reduce the number of hopper cars from 234,730 to 141,600, and barge requirements would fall by one-third. But "complete implementation of best practices by 1985 is unlikely," it states.

Unit trains are the key to efficient coal movements, the Bureau said. Each hopper car travels 57 miles per day, spending only about 3 hr in transit. But on a unit train, the average hopper travels 400 miles per day.

New car deliveries in 1975 totaled 72,367—highest in seven years—and 30% of these were open-top hoppers. New orders during that year totaled 33,484, and 39% were for hoppers.

In the West . . .

Seven western states are projected to increase coal production to a whopping 469 million tpy, according to the recently published US Bureau of Mines Report IC 8719, "Projects to Expand Fuel Sources in Western States." Production will come from new mines and expansions to existing operations in Arizona, Colorado, Montana, New Mexico, North Dakota, Texas, Utah and Wyoming.

Questions are being raised as to whether or not the railroads alone can effectively and economically handle an increase of this magnitude. Railroads contend they can. Others believe an elaborate transportation network consisting of railroads, slurry pipelines and expanded river and lake facilities will be required to move western coal to eastern, southern and Pacific Coast markets.

A recent rail-oriented coal transportation study conducted by the US Department of Transportation, Office of Transportation Energy Policy, and Transportation System Center, Research Div., attempted to identify and quantify transportation requirements for future energy materials movements. Input Output Computer Services, Inc., Cambridge, Mass., prepared the study.

Some findings of this report include that railroads will continue to be the principal hauler of coal in the US in the near future. Predictions beyond 1985 are extremely difficult, due to the uncertainty in energy markets and technological changes in transportation, it said.

Without a firm national energy policy, railroads, coal operators and power plants are hindered in assembling the capital and facilities necessary to increase coal production and transportation. The establishment of a national energy policy encompassing all phases of development from mining to consumption is required to reduce uncertainty.

The most dramatic increase in rail coal traffic is expected to be in the western district (areas west of the Mississippi River). Participating roads expect to increase their western-originating coal traffic by 323%, from 66 million tons in 1974 to about 279 million tons in 1980. Their investment requirements call for 29,000 new 100-ton equivalent cars, 1500 locomotives rated at 3000 hp, and over $1 billion in fixed-plant facilities used for coal movement from the West.

Even if the railroads overcome the many obstacles facing them, unit-train traffic, particularly at the levels anticipated in some areas of the Northern Great Plains, primarily Montana, North Dakota and Wyoming, may have substantial adverse effects, especially social and environmental.

"Coal Development and Governmental Regulations in the Northern Great Plains: A Preliminary Report," prepared in part under a grant from the National Science Foundation and with the support of the Rand Corp., points out that noise from traffic caused by the increased number of unit trains could affect livestock activity, wildlife, people living near the rail line, inconvenience for vehicular traffic at grade crossings, and fire hazards along the line.

Can slurry pipelines ease the transportation strain?

The report includes an estimate of the number of unit-train departures from the Eastern Powder River Basin and the Tongue River Area (Decker and Wolf mountains) with and without slurry pipelines, with production at levels of indicated and possible capacity by 1985. Only capacities from mines being developed to serve out-of-state utilities are included (see table).

The number of departures is shown for three different levels of unit-train capacity, which bracket the likely range of capacity that will be used. This particular area is used because all rail traffic departing from the area will do so by only two main lines, those of the Burlington Northern and the Chicago and Northwestern.

At 45 departures per day, for example, and assuming that the busiest of these two routes would have 60% of the traffic, a unit train would be leaving or arriving on this route on an average of every 27 min. At 25 departures per day, a unit train would be leaving or arriving over the busiest route every 48 min. With 68 departures per day, a unit train would be leaving or arriving every 18 min, or every 15 min between trains. That is a lot of trains by any standard. The table shows how the number of trains could be reduced by installing one, two and three slurry pipelines.

Railroads argue convincingly that historically they have been economically discriminated against by government-subsidized competitors—truck and barge lines. And to permit coal slurry pipelines to be built would only add another competitor to their list. Slurry pipelines, incidentally, can be used to transport materials other than coal.

Railroads are attempting to deny privately owned slurry pipeline developers the legal right of eminent domain. But slurry pipelines, according to transportation experts, should have the right to compete on the same terms as other public utilities. In view of the critical transportation needs for western coal, the US just may need slurry pipelines to ease the energy shortage. These same experts also believe that slurry pipeline companies should be given the right to show whether or not they can help solve the energy problem.

Inland waterways: Vital link to western coal transportation

River barges move huge tonnages of western coal on the Mississippi and Ohio rivers. And limited volumes of coal move to points of use on the Great Lakes. These modes of transportation must be expanded and upgraded if they are to contribute to solving the energy problem. Some progress is being made by these utilities to increase capacities and efficiencies.

For example, a giant coal-loading facility at Superior, Wis., owned by Detroit Edison, has completed construction of a 40,000-ton lake vessel, with a second 60,000-ton unit nearing completion. This facility handles all of Detroit Edison's coal requirements, and it is looking for additional customers. The facility presently moves 4 million tpy of coal to Detroit. Elwood Zavity, president, Midwest Energy Resources, subsidiary of Detroit Edison, says that 12 million to 14 million tpy will pass through the facility by 1980.

Unit train traffic

Projected unit train departures from Eastern Powder River Basin and Tongue River coal mines[a] with and without slurry pipelines[b]

(Departures per day)

Capacity, tons per train	— Number of slurry pipelines — None	One	Two	Three
Indicated capacity (166 mty exported)				
@ 8,000	57	48	40	31
@ 10,000	45	39	32	25
@ 12,000	38	32	26	21
Indicated and possible capacity (200 mty exported)				
@ 8,000	68	60	51	43
@ 10,000	55	48	41	34
@ 12,000	46	40	34	29

[a] Includes all electric utility use—exported out of state—mines on Decker, Gillette, Sheridan and Wolf Mountains coal deposits.

[b] Assumes 25 million tons per year per slurry pipeline.

Source: "Coal Development and Government Regulation in the Northern Great Plains: A Preliminary Report," published by The Rand Corp.

Construction began in December, 1976 by American Commercial Barge Lines, Western Div., on a coal transfer loading station at St. Louis, Mo., to move coal on the Mississippi. First shipments are expected to begin in late 1978. ☐

In the East . . .

The Bureau of Mines says some transportation bottlenecks in the eastern states could develop if the US intends to reach the Project Independence goal. But improvements in efficiency of movement and intermodal competition of coal business could easily handle a doubling of production, it says.

Six of the seven largest coal-hauling railroads are in the East and all are investing heavily in new equipment to handle anticipated traffic increases. The Chessie, for example, has embarked on a half-billion-dollar, two-year program calling for installation of 16,000 new 100-ton open-top hopper cars at a cost of $409 million.

But despite railroad confidence in being able to acquire all the hopper cars needed, some major questions remain about the condition of road beds and the ability of some financially pressed railroads to make necessary repairs. The Department of Transportation is pushing the roads to begin abandoning some lines so federal aid can be targeted where it will do the most good.

Barge operators continue to press for construction of a new locks and dam complex near Alton, Ill., on the Mississippi River. But Congress has yet to approve the controversial $500-million project, largely as a result of objections from railroad and environmental groups.

The barge operators also are fighting a battle over construction of a waterway that would connect the Tennessee and Tombigbee rivers, which would provide a major avenue for coal transportation through the South. The $1.6-billion project is only 6% complete, and environmental and railroad interests have filed suit to block further construction.

Trucking has become more important in the East as smaller mines have opened up. The key problem for trucks is the condition of coal-haul roads in the Appalachian Mountains. The roads are falling apart under the constant traffic of heavy coal hauls, and now the Department of Transportation is planning to ask Congress to spend up to $4 billion over 10 years to upgrade the roads.

Little growth is expected in use of conveyors to move coal, although refinements in the technology may enable use of the belts up to 20 miles. Largest user of conveyors today is the American Electric Power Co., which uses belts at three of its power plants in Ohio and West Virginia. ☐

Goldman Sachs Seminar May 1977

Post May 1

ROCK ISLAND ACQUISITION

Rio Grande Near New 'Giant' Status

By WILLARD HASLEBUSH
Denver Post Business Editor

"We're going to win," G.B. (Gus) Aydelott says. "Somewhere along the line we're going to win out."

The head man of the Denver & Rio Grande Western Railroad believes his personal dream is coming true. If that is so, the Rio Grande Railroad will emerge in Aydelott's time as a new giant. It will begin handling freight not only from the Rockies but from most of America east of Kansas City, Mo., and Council Bluffs, Iowa, the interchange gateways to the East Coast, the Deep South, the Gulf.

AYDELOTT HOPES the Rio Grande can buy the Rock Island Lines trackage linking Denver with the freight interchange points of the Midwest—Kansas City and Council Bluffs. The purchase, if it clears the hurdles, would make new millions of dollars for the Denver-based railroad. Trains of the Rio Grande would be made up at the interchange cities with freight cars bound west for energy-producing country. And Rio Grande rails would carry coal by the millions of tons to new markets east of the Mississippi and south of Kansas City.

Aydelott made his "We're going to win" statement last week at the annual shareholders' meeting of Denver-based Rio Grande Industries, Inc., which he heads. The railroad is the firm's largest subsidiary.

Aydelott told his stockholders that the Rock Island is dealing head-to-head with the Rio Grande, is willing to sell the trackage the Denver-based railroad wants, and is arguing now only over price. "Their idea of what it's worth is much higher than what we're willing to pay. But we're negotiating," he said.

THE FACT THAT the Rio Grande and the Rock Island are talking terms with no other railroad involved is a triumph for Aydelott. Until early this year, almost every major railroad was involved in a 14-year-old battle before the Interstate Commerce Commission (ICC). The prize was Rock Island trackage. The case began when the Rock Island went into bankruptcy. Other railroads moved in to divide the spoils and capture routes in mid-America.

The ICC ended the free-for-all last Jan. 7. It said in effect that only the Rio Grande now could bargain for the Denver-Kansas City-Council Bluffs line. And the Rock Island, in bankruptcy still but no longer in such dire straits, began the Rio Grande talks.

A Rock Island spokesman said in Denver recently that his railroad is becoming a viable company "with light at the end of the tunnel hinting an end to bankruptcy court operation." He said the Rock Island is thriving on its "Sunbelt Route" running west and south from Memphis, Tenn. He didn't put it in exact words, but he made it plain that the Rock Island would not be harmed now if it sold the Denver-Kansas City route to the Rio Grande.

How to Save Office Energy Topic Tuesday

A seminar on energy conservation for office-building owners and managers will be held from noon to 5 p.m. Tuesday at the Cosmopolitan Hotel.

The sponsor is the Denver chapter of

Training Films

Post May 1 77

NEW EQUIPMENT FOR COAL BONANZA

Railroads Eager for Outlay of $6 Billion

(C) 1977, Denver Post-Newhouse News Service

WASHINGTON—Railroads may have to spend almost $6 billion for new equipment to haul the two-thirds increase in coal production President Carter wants by 1985.

But rather than shrinking from the prospects of additional investment, the railroads are champing at the bit.

Railroads can handle even the largest of coal production increases and the prospect "holds bright promise," says William H. Dempsey, president of the Association of American Railroads (AAR).

LOUIS W. MENK, chairman of the Burlington Northern, pledges that the railroads are ready to carry more coal to every one of the 48 contiguous states, and says the additional business "could be the salvation" of some rail companies.

(The Denver & Rio Grande Western Railroad expects to haul a record 15.5 million tons of coal to market from Colorado this year. G. B. (Gus) Aydelott, chief executive officer, says money has been earmarked for an upgrading of roadbeds to "handle heavy coal instead of hay." He says coal-hauling money will lead a new profit-making year for the parent firm, Rio Grande Industries, Inc.)

Railroads currently carry two-thirds of the almost 600 million tons of coal produced annually. It is their No. 1 commodity.

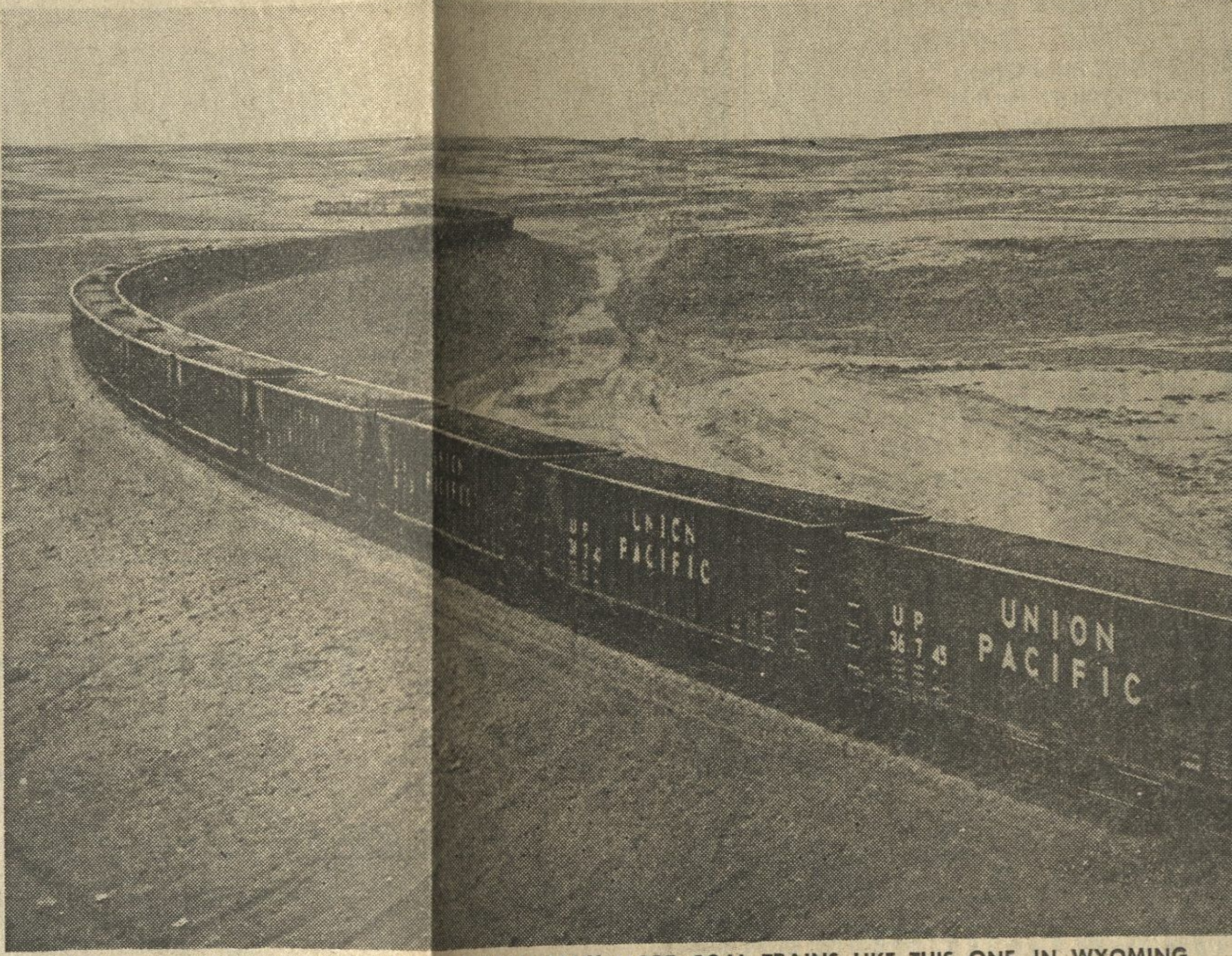
"If railroad coal traffic increases to an approximate total of 725 million tons by 1985, a substantial amount of additional equipment — both open-top hopper cars and locomotives — would be required," says AAR.

THE INDUSTRY estimates that from 9,700 to 13,400 new cars would be needed and from 485 to 670 locomotives. If the lower figures are used, the investment during next eight years would total about $4.2 billion.

There are no reliable estimates for the costs of wear and tear on tracks caused by the additional coal-carrying, according to the industry, but the increased business would be used to finance the repairs.

About the only dark cloud on the railroads' horizon comes in the form of pipelines that carry a mixture of crushed coal and water known as slurry.

Menk and Dempsey told a House subcommittee last week that legislation proposing interstate coal slurry pipelines would hurt the railroads.



RAILROADS SAY THEY'RE WILLING TO RUN MANY MORE COAL TRAINS LIKE THIS ONE—IN WYOMING.

"**THE ISSUE** is not merely whether coal slurry pipelines should be built but whether more privately owned railroad companies would be pushed into bankruptcy and government operation in the 1980s," Menk said.

Dempsey said the pipelines would skim the cream of the business, carrying coal under long-term contracts from a few large producers to a few large consumers. Railroads, he continued, "would be required to provide service to all, including the less desirable, low-volume traffic not profitable for pipeline carriage."

Pipeline developers, however, maintain there is enough coal to carry for all, although pipelines can do it more cheaply.

FOR SEVERAL YEARS, coal slurry developers have been asking Congress to grant them the right of eminent domain — the power to acquire private lines in the public interest — that natural-gas pipelines and others enjoy.

Eminent domain is crucial to the development of the half dozen or so interstate pipelines proposed, according to M. Pat Jennings, president of the Slurry Transport Association. One proposed route, for example, stretching 1,300 miles between the coal fields of Wyoming and a utility in Arkansas, would cross railroad-own land 48 times.

Besides the railroads, environmentali and farmers have expressed concern t slurry pipelines will use water that Western states can ill-afford to give up

IT TAKES UP TO 500 gallons of wa to move a ton of coal.

Pipeline supporters acknowledge t water is a problem in some areas, the water they use is often unsuitable agricultural purposes. They also say slurry industry would abide by the s laws governing water use.

Jittery Market Watching For Rise in Interest Rate

NEW EQUIPMENT FOR COAL BONANZA

Railroads Eager for

(C) 1977, Denver Post-Newhouse News Service

WASHINGTON—Railroads may have to spend almost $6 billion for new equipment to haul the two-thirds increase in coal production President Carter wants by 1985.

But rather than shrinking from the prospects of additional investment, the railroads are champing at the bit.

Railroads can handle even the largest of coal production increases and the prospect "holds bright promise," says William H. Dempsey, president of the Association of American Railroads (AAR).

LOUIS W. MENK, chairman of the Burlington Northern, pledges that the railroads are ready to carry more coal to every one of the 48 contiguous states, and says the additional business "could be the salvation" of some rail companies.

(The Denver & Rio Grande Western Railroad expects to haul a record 15.5 million tons of coal to market from Colorado this year. G. B. (Gus) Aydelott, chief executive officer, says money has been earmarked for an upgrading of roadbeds to "handle heavy coal instead of hay." He says coal-hauling money will lead a new profit-making year for the parent firm, Rio Grande Industries, Inc.)

Railroads currently carry two-thirds of the almost 600 million tons of coal produced annually. It is their No. 1 commodity.

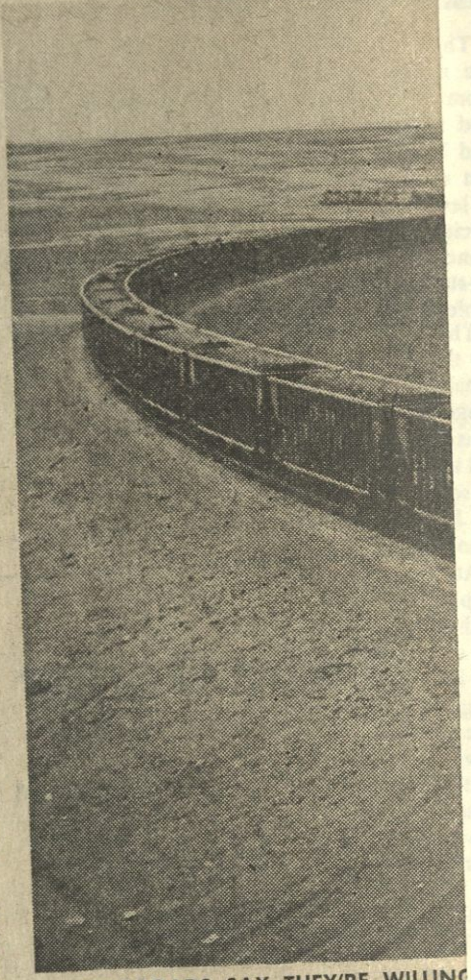
"If railroad coal traffic increases to an approximate total of 725 million tons by 1985, a substantial amount of additional equipment — both open-top hopper cars and locomotives — would be required," says AAR.

THE INDUSTRY estimates that from 9,700 to 13,400 new cars would be needed and from 485 to 670 locomotives. If the lower figures are used, the investment during next eight years would total about $4.2 billion.

There are no reliable estimates for the costs of wear and tear on tracks caused by the additional coal-carrying, according to the industry, but the increased business would be used to finance the repairs.

About the only dark cloud on the railroads' horizon comes in the form of pipelines that carry a mixture of crushed coal and water known as slurry.

Menk and Dempsey told a House subcommittee last week that legislation proposing interstate coal slurry pipelines would hurt the railroads.



RAILROADS SAY THEY'RE WILLIN

"THE ISSUE is not merely whether coal slurry pipelines should be built but whether more privately owned railroad companies would be pushed into bankruptcy and government operation in the 1980s," Menk said.

Dempsey said the pipelines would skim the cream of the business, carrying coal under long-term contracts from a few large producers to a few large consumers. Railroads, he continued, "would be required to provide service to all, including the less desirable, low-volume traffic not profitable for pipeline carriage."

Pipeline developers, however, maintain there is enough coal to carry for all, al-

Periscope

THE HOWARD HUGHES PAPERS

A secret hoard of Howard Hughes's personal papers may provide new and intimate glimpses of the late millionaire's private and political obsession with the Kennedy family. Free-lancer Michael Drosnin is asking publishers for a $100,000 advance to write a book based on 7,000 Hughes documents, many of them purportedly in Hughes's handwriting and some of which may have been stolen from Hughes headquarters in 1974. According to those who have seen the papers, Hughes seems preoccupied with the Kennedys' influence, which he calls a relentless thorn in his side. He deplores John F. Kennedy's marginal victory over his man Richard Nixon as a cruel personal blow and writes that he wanted Robert F. Kennedy for President as much as he wanted the mumps. But he shows respect for the Kennedy political machine. The night Robert was assassinated, Hughes ordered aide Robert Maheu to hire the entire Kennedy organization to back his own candidates. Hughes thought the suddenly leaderless workers would be alone and frightened and he saw a once-in-a-lifetime chance to grab a ready-made political apparatus. (A year later, he did hire Kennedy man Larry O'Brien as a consultant.)

Steve Phillips—New Times

Drosnin: Looking for $100,000

TURNOFF

Farrah Fawcett-Majors, the TV actress whose poster-portraits became as ubiquitous as the kitchen sink, has inspired a counter-poster. Two Chicago entrepreneurs have put out a $2 poster titled "Farrah Faucet" that displays just that—a tap from a kitchen sink. The publishers (who call their company "Tongue-in-Chic") claim that the first 500-copy press run sold out.

Farrah
Faucet

Gerretsen—Gamma—Liaison

Farrah Fawcett-Majors and poster: Sellout in Chicago

WELCOME TO DANNY THE RED

Daniel (Danny the Red) Cohn-Bendit, 32, the self-proclaimed German anarchist who led the 1968 anti-government riots in Paris, will be granted a visa to visit the U.S. next month—with the blessing of the State Department. Now a sociologist working peacefully in a Frankfurt bookstore, Cohn-Bendit says he plans to visit U.S. campuses during his stay. In the past, he would have been banned from the U.S. under the McCarran Act, which prohibits anarchists and those advocating the violent overthrow of a government from stepping ashore. But to dramatize President Carter's avowed open-door policy for all international visitors, the State Department has decided to make an exception in Cohn-Bendit's case.

Edward Behr—Newsweek

Cohn-Bendit: Campus-bound

OUR MAN IN AFRICA

Vice President Walter Mondale, tapped by Jimmy Carter a fortnight ago as his man on Africa, may soon be packing his bags for a mission there. No firm decision has been made, but Carter, Secretary of State Cyrus Vance and White House security adviser Zbigniew Brzezinski have been holding quiet discussions about sending Mondale on a swing through Black Africa, as well as white-ruled Rhodesia and South Africa. The dates under consideration at this time call for the Vice President to take off in late May or early June.

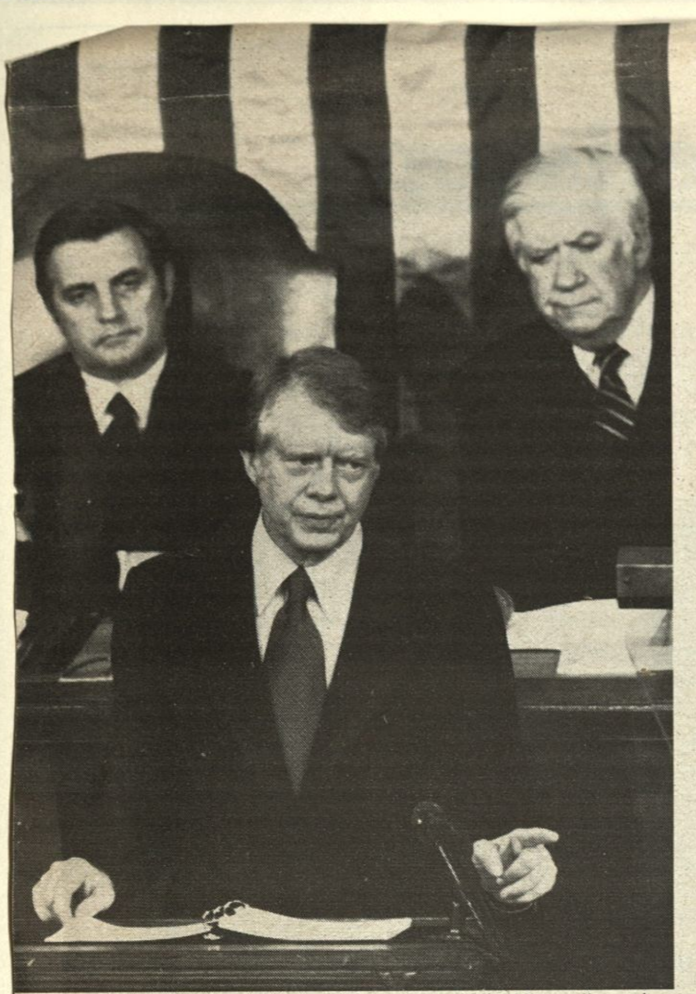
HOW MUCH OIL?

The CIA study of world oil reserves cited by President Carter in his recent energy statements has one major dissenter, at least on the matter of the Soviet Union's resources. The Pentagon's Defense Intelligence Agency places Soviet proved reserves at 85 billion barrels and figures that, with its coal and natural-gas deposits, Moscow will not have to look to outside sources for at least another ten years. The CIA, however, put Soviet reserves at only 30 billion to 35 billion barrels, roughly equal to those of the U.S. Even allowing for differences in interpreting oil statistics, the disparity between the two estimates is bound to raise the question whether the President chose to cite the CIA figures because they bolstered his gloomy view of world fuel supplies and their impact on U.S. energy needs.

—JOHN A. CONWAY with bureau reports

Goldman Sach Seminar May 1977
Background and [illegible] traffic projections

Newsweek



Wally McNamee—Newsweek

WHAT PRICE ENERGY?

Some of the time, he was Jimmy the evangelist, preaching to a nation living in energy sin. Then he was Jimmy the engineer, rattling off statistics and throwing around terms like retrofitting and cogeneration. And then he was Jimmy the leader, summoning the nation to fight the "moral equivalent of war" and calling on everyone to sacrifice for the commonweal. But by the end of an all-stops-out TV blitz last week to sell his new energy program, Jimmy Carter had achieved just about everything he had hoped. A Gallup poll commissioned by NEWSWEEK showed widespread public support for most of his energy proposals and for the President himself (page 15). And Congress seemed ready to act on the entire package—with the likelihood that nearly all of it will be law by the end of the year.

For the first time, a strong activist President had seized the initiative on energy, setting the substance and the tone of the debate to follow. There is now an energy policy on the drawing boards that can fairly be called comprehensive, not the usual grab-bag of unrelated bills. If Carter's package passes, the nation will begin the long march away from a dwindling supply of oil and natural gas toward the greater use of more abundant coal, nuclear and solar power.

Above all, Carter has committed America to a strategy of conservation—a wrenching change for a country accustomed to living off its mineral wealth. Energy prices will rise, causing at least some economic dislocation (page 21) and perhaps even a modest change in life-style (page 25). "With the exception of preventing war," Carter said during his first televised speech Monday night, "this is the greatest challenge our nation will face during our lifetime."

The rhetoric was a deliberately overstated part of Carter's strategy. Earlier polls had shown that at least half the public still doubted that the energy crisis was real. Carter's first speech was an exercise in consciousness-raising, a rallying cry for public support of a spread-the-suffering program. "We'll be 75 per cent of the way home when 75 per cent of the people believe there's a problem," said one top Carter aide. And by equating conservation with national sacrifice in a time of crisis, the President hoped to defuse criticism and stiffen Congressional resistance to the special-interest lobbying that was bound to come (page 30). "It's damn near unpatriotic to oppose the President right now," chuckled legislative aide Frank Moore.

Still, the infighting is bound to become intense. By emphasizing conservation of oil more than production, Carter's program has stung the oil industry. Oilmen wanted Carter to allow prices to rise in a free market, thus providing an incentive for production as well as for conservation. Instead, Carter proposed to raise prices by slapping an excise tax on oil already being pumped—with the money going to the Federal government, not the producers. "This program is a step backward for oil exploration," complained Ted Eck, chief economist at Standard Oil of Indiana. "It's a windfall loss for the industry."

Carter's planners disagree. They have proposed that all newly discovered oil be sold at world prices in three years—incentive enough, they say, for further exploration and production. But that is the core of the disagreement: while the oil industry and many outsiders argue that there is plenty of fossil fuel available if the price is right (page 27), Carter and his advisers are convinced at bottom that more incentives would be a futile exercise in a world rapidly running out of oil.

'TIGHTENING THE SCREWS'

There were other troubling complaints. The coal companies, called on by Carter to produce an additional 400 million tons annually, said that the President's modest output targets and continued support for environmental controls would make the shift to coal impractical. "They are tightening the screws everywhere on strip-mining and clean air," said Carl Bagge, president of the National Coal Association. "This is a blueprint for disaster." And such grumbling led some conservationists to fear that Carter would ultimately sacrifice environmental standards on an altar of coal. On a philosophic level, advocates of a free-market economy questioned whether the massive shifting of funds implied in Carter's complex tax-and-rebate system would do much more than establish a vast new bureaucracy. And there were indications that Carter planned to use at least some of the energy-tax money to finance Administration welfare and tax reforms. "We still have to have some flexibility about exactly what we do," said the President at his Friday press conference.

Perhaps the biggest question of all was whether individual families would be required to make the sacrifices suggested by the President's Monday-night speech. As the details started emerging in his address to Congress Wednesday night, it seemed the original speech was more bark than bite for individuals—and by the weekend the White House was downplaying sacrifice to stress that the program would actually benefit low- and middle-income families. All consumers would pay higher energy prices and some would be penalized if they bought

Goldman Sach Seminar May 1977
Background docs Evaluating traffic projections

ENERGY GROUP

To J Timberlake
J

An Institutional Service
INDUSTRY PERIODICAL
March, 1977 RI 111/85–09

THE COAL OBSERVER

Joel Price, CFA
Vice President

The Coal Observer is a periodical that comments on and analyzes current events and items of interest in the metallurgical and steam coal industry, both domestic and foreign, as well as their effects on major corporate entities.

THE UNITED MINE WORKERS – ANOTHER DAY OLDER AND DEEPER IN DEBT

As the United Mine Workers' June elections draw closer, the question of a December, 1977, strike moves from a possibility to a probability, and wildcat strikes have broken out anew in the coal fields. Thus, some further analysis of today's labor situation seems in order.

Where Are We Now?

Total disarray . . . board-meeting capers out of the Keystone cops . . . uncontrollable wildcats for sometimes bizarre reasons and for causes of dubious value, despite personal economic peril . . . a union whose leaders are ignored . . . an upcoming election that offers little hope of a better tomorrow . . . a pension fund in jeopardy because cash inflows are tied to tonnage production . . . financial distress within the union itself, leading to abandonment of COMPAC, the legislative lobbying arm, and to consideration of selling the 75% interest in the First National Bank of Washington (the Arabs are high bidders). This is only a fragmented picture of the UMW today.

Too Close to Call

There are now three serious contenders for the UMW presidency: incumbent Arnold Miller, secretary-treasurer Harry Patrick, and board member Lee Roy Patterson. Were the election held today, Miller might just retain the presidency, albeit with a 34% mandate.

Harry Patrick, a former Miller supporter, is a "progressive" candidate with a fiery speaking style. Observers note his charisma and effectiveness in meetings with local unions. He stands to gain

ADDITIONAL INFORMATION ON COMPANIES MENTIONED IN THIS REPORT IS AVAILABLE ON REQUEST.
The information and data in this report were obtained from sources considered reliable. Their accuracy or completeness is not guaranteed, and the giving of the same is not to be deemed an offer or solicitation on our part with respect to the sale or purchase of any securities or commodities.

COPYRIGHT 1977 DEAN WITTER & CO. INCORPORATED 130 LIBERTY STREET NEW YORK, NY 10006 TELEPHONE (212) 437-3000

DEAN WITTER & CO. Incorporated

support from younger UMW members, turned off by Miller's nonperformance, but his own West Virginia district gave its nod to Lee Roy Patterson.

The dark horse of the race is clearly Lee Roy Patterson, who comes from a small strip-mining district in western Kentucky. A hard-nosed and motivating speaker, he has the weakest political base of the three candidates. However, he was an active supporter of former UMW chieftain Tony Boyle, who managed to garner 40% of the popular vote in 1972. Boyle is still well regarded in some sections of the eastern coal fields, particularly among the older, more conservative rank and file. With Boyle recently granted a new trial by the Pennsylvania Supreme Court for the murder of Joseph "Jock" Yablonski, Patterson's chances may be moderately enhanced. His real strengths are his outsider image and the support of the International executive board, which runs the districts. Some feel that, with Patrick and Miller splitting the more "liberal" vote, Patterson could slip into a long-shot victory.

The Enigmatic Arnold Miller — the French Revolution

Although campaign rhetoric and accusations need not be repeated here, Arnold Miller's presidency has been strife-ridden. He assumed office in 1972 on a wave of euphoria. The age of reform had arrived in the UMW, as the newly elected official worked to open up a traditionally closed, autocratic union to its rank and file. Unfortunately, too much democracy in too short a transitional period unleashed forces that were beyond control. And in the tradition of the French Revolution, every morning seemed to bring two more enemies than the night before.

Sadly, Miller is victim to, as well as party to, the tragedy of the UMW; he is not the sole cause of the present state of disintegration. One must remember that he and his slate were reform candidates not accustomed or conditioned to the political infighting that had become the standard order of procedure for the union's operations. The result has been chaos. The UMW International board is aligned against Miller, and two of his elected lieutenants, vice president Mike Trbovich and treasurer Patrick, turned vocally dissident, the latter more recently.

Miller has subsequently become suspicious of everyone. Operating under powers of the union constitution, during the past year he has banished several opponents to Siberia — for example, an ostensible inspection trip to Alaska. There have been firings, fist fights, a wrestling match, and resignations, not to mention confiscating an office door, banning long-distance telephone calls, and eliminating travel expenses. The president has become the chief press officer, and the *UMW Journal* has almost turned into a vegetable.

Time magazine has quoted Miller as follows: "Julius Caesar had his Brutus, but I've got about a hundred Brutuses. The problems I have are not with the membership, it's with the elected officials and staff." However, he is not without problems among his constituency, despite the statement. On three separate occasions his direct appeals for miners to return to work from widespread wildcats have been shouted down by militant locals in West Virginia.

Were the election held today, Miller might be the victor by a slim margin. No matter what his leadership shortcomings, the top position of the UMW is akin to royalty in the eyes of many rank and filers. To some, Miller is a reassuring grandfather figure. However, if he does win, the dispute with the International board will continue as before, and a new staff will have to be reassembled from the remaining skeleton. Pathetically, no candidate offers the promise of a new dawn.

RIGHT TO STRIKE

No matter who emerges victorious, the competency of the Washington headquarters to put together position papers for the forthcoming contract negotiations is open to grave doubt, considering the resignations, dismissals, and demotions of key people active in policy formation three years ago such as Tom Bethel, Rick Bank, and "Chip" Yablonski. Because these sessions could be the toughest in recent history, this bodes ill for the coal industry.

The key point in the upcoming contract talks, which will start in September or October, will be

Goldman Sach Seminar May 1977
Background docs [illegible] [illegible] projections

whether the limited right-to-strike provision is *an* issue or *the* issue. Coal operators sacrificed many other demands in order to win the no-strike clause, including a complete overhaul in 1974 of the grievance procedure. If the arbitration system has worked, it is certainly belied by the numbers in Table 1, below. Wildcats have started because the water in the bathhouse was too hot, too cold, or too tepid. Walkouts occurred because of the theft of a citizens' band radio in a parking lot or because of bomb threats — an inventive method of a very few for not working. However, the Federal Bureau of Investigation has recently apprehended and convicted some of these callers.

The Sad Experiences of Eastern Associated Coal

Eastern Associated Coal has made major efforts to keep communication lines open with the union. It has steadfastly refused to utilize the injunctive mechanism, and in fact, before his departure, Tom Bethel of the United Mine Workers commented to us that, if all operators were represented by people like Eastern's vice president of production, John Higgins, life *might* be somewhat less complicated. It is well known that some 30,000 miners have been on strike recently, in major portions of southern West Virginia, spreading into Illinois, Indiana, and parts of Pennsylvania.

It may be instructive — or frustrating — to examine what occurred at Eastern Associated Coal in February, since the events there have been called the trigger.

Instant Illness

All underground mines commonly change work assignments in a crew when, for example, equipment malfunctions. Lately, a discernible trend has been that in such circumstances some men suddenly develop an illness and leave the mines — and production ceases. The UMW contract states that, if a man reports out sick, he must return with a doctor's slip. However, this rule is almost never enforced.

Given the untenable situation at Eastern's mines, posted notice of the governing ground rules was clearly in order, although only after full discussions with the communications committee of the locals. Eastern's simple policy was that, if a man became "ill" and left work, a doctor's slip would be required the following day. Unfortunately, rather than solving any problems, it became the basis for wildcats at the Wharton mine. Harry Patrick decided to insert his two cents worth and inflamed matters; he would picket, too. The International, it should be noted, was appalled by his comments, which appeared to be an unwarranted election ploy.

Dispatcher Daffiness

Almost simultaneously, an unrelated situation came to a head in another unit. At the Harris mine, which supplies Carolina Power & Light, a dispute was forwarded to an umpire to determine whether the dispatcher's post should be occupied by a company foreman or be covered under the union

Table 1

WILDCAT STRIKE LOSSES, 1973–76
(Dollar Amounts in Millions)

	Man-Days Lost	Payroll Lost	Tonnage Lost (Millions)	Trust Funds Lost
1973	529,000	$ 26.3	7.0	$ 4.8
1974	1,023,801	53.8	11.7	10.5
1975	1,417,426	78.8	15.8	22.2
1976	2,007,000	111.1	19.8	36.9

Note: 1976 figures are preliminary. Source: Bituminous Coal Operators of America.

contract. There has been no clear ruling in the past, and the umpire's judgment favored the union. The contract states such an opening must be filled by the senior most-qualified person. The trouble was that no one possessed sufficient qualifications at Harris; hence, the only option was to make it a training job available to the senior qualified person. Interestingly enough, this was acceptable to the Harris local.

However, some men at Kopperston, Eastern's major mid-volatile mine, had a different reading of the situation. They decided that the senior motorman was the eligible person, later amending that to the senior motorman who bids, even if he is not qualified. But the rules stipulate the senior most-qualified individual; therefore, as in the case of Harris, a training position would have to be created. The Kopperston mine and Keystone 2 (low-volatile) walked out, and this, atop the sick-notice issue, quickly spread throughout southern West Virginia mines in District 17. The fire was fanned by roving pickets, in effect coercing miners not to break tradition by crossing the line.

No Choice but an Injunction

Eastern met with district leaders and even rewrote the procedure to the district's satisfaction, only to have it voted down that night. So the company — a holdout in the use of the injunctive mechanism, believing that it is a poor way to settle disputes — was left no option other than obtaining a court injunction; complaints were also filed with the National Labor Relations Board. What happened? The men returned at Kopperston, but Wharton and Keystone balked. Arnold Miller dispatched Harry Patrick to convene union leaders with John Higgins of Eastern. Some 40–50 men attended, and it was agreed to submit the dispatcher dispute to arbitration and to rescind the sick-leave policy in exchange for a union pledge to use its best offices to remove the root cause; miners reappeared at work the following day.

The real truth is that the time had come to terminate this particular winter madness. In some ways it reminds us of the union disputes last summer, which basically related to injunctions, in the final analysis. Eastern, the injunction holdout, found its mines among the first closed. No wonder some management people throw up their hands in despair and say, "What's the use?"

Of course, it doesn't end there. In northern West Virginia at Federal 1 and 2, when an arbitrator upheld dismissal of a safety committeeman, another set of wildcats erupted, and an injunction was ignored. Common sense and cool heads apparently remain on vacation in West Virginia, while anarchy rears its ugly head again.

Limited Right to Strike — the Compelling Negatives

We can only conclude that granting a limited right to strike is no panacea for unauthorized work stoppages. The union has consistently proved itself unable to enforce discipline among its members. Why then should the operators believe locals can judiciously authorize strikes and then assure immediate return to work when the issues are resolved? Additionally, insertion of a limited right-to-strike clause is contrary to the procedures emerging in labor relations today and undermines the entire union-management structure of negotiated arbitration.

Finally, seemingly forgotten is the reason management signs a contract in the first place — to gain stability of operations. How can this be achieved if five men can close three coal mines? In other words, in any dispute generally 85% of the men will say no, 10% will be indifferent, and 5% will want to strike or use violence to accomplish their ends.

Laws are effective only if obeyed. In short, the union must abolish its unwillingness to follow contractual procedures, as well as its willingness to use extracontractual procedures to accomplish its objectives. The letter of the contract must be observed. Stranger pickets must be eliminated. A duly agreed-upon, signed contract is really the only purpose for a union to exist; in the past UMW members have died for that contract.

What's a Company to Do?

As rationality seemingly leaves many locals in West Virginia, as the grievance machinery is increasingly bypassed, and even as the arbitrators' decisions are ignored, the company often turns to its last resort

Goldman Sachs Seminar May 1977

– the court-ordered injunction. When miners still refuse to work, where are we?

On the other hand, temporary restraining orders give the union an out, because without an injunction, the unionist legally must return to the mine – whatever that means. But with an injunction, the court somehow appears to be the bad guy, and some miners feel vindicated. When it comes to wildcats, attitudes and traditions are involved that neither the companies nor the courts can breach. The union equates injunctions to Pinkertons – a hated image in American labor relations, dating back to the 1930's and 1940's. This attitude, which may operate subliminally, needs to be broken.

When institutions such as the United Mine Workers stand in the way of necessary growth, there seem to be two alternatives: dissolution or fragmentation. Back in 1950, after a long and difficult battle, John L. Lewis and the operators struck a bargain. In exchange for the UMW letting the miners return to work and allowing initiation of mechanization in the mines, management agreed to establish a welfare fund. Both Lewis and the industry had to act; otherwise, the union would have ceased to exist.

In 1977 the UMW seems to be in a similar position. A national agreement is the reason for a person to be part of the international union. It creates pressure on the company that wants to produce, and if it is ignored and defiance is flaunted, other ways must be found, such as dealing with locals or districts directly or creating other unions to supplant the existing one.

What Management Must Do

One thing should be clear: Operators have a role to perform, as well. There must be a movement toward more flexibility in scheduling. A real look must be taken at the training of front-line and middle-line supervisors. The distinction between company and union men must be eradicated to allow the men to identify with the company, to eliminate the "us versus them" attitude. There must be differences in responsibilities and more participation in mine decisions. A good example is the autonomous work group used in Rushton Mining, commented on fairly objectively in a recent issue of the *UMW Journal*.

An encouraging sign – of which there are too few – is that many of the new, young members of the union are better educated and more savvy than their predecessors, although harder to control. The wildcat is really a threat to the union, and its impatience with wildcats seems to be growing. What is needed is more effective leadership at the local level. Some observers note that it may be ten years before stability can return to the United Mine Workers, which, incidentally, represents only 62% of all miners in the United States today.

One school of thought suggests that, since the greatest difficulty lies in southern West Virginia – namely, Districts 17 and 29 – perhaps those areas should be isolated. In other districts it is possible to achieve reasonable stability. If this is so, support for southern West Virginia might not be forthcoming so readily. Districts 17 and 29 have one-third of the UMW working membership, but there is no effective political control there; in District 17 anarchy reigns.

No Relationship Between War Chest and Length of Strike

There appears to be no historical relationship between the war chest and the length of a strike. Last summer, when there were six weeks of illegal work stoppages, the men walked out immediately after vacation, without a paycheck in between. In central Appalachia in particular, the miners will not allow inventories to build up – whether the tactic be a four-day workweek or a union memorial period of up to ten days, spelled out in the national contract. The fact that the strike would theoretically begin on December 6 is a plus for the industry, because Christmas has not been a strike period for at least 25 years. In reality this contract will test the concept of a national agreement, and the bargaining could be nightmarish.

The union has a legitimate list of demands for the upcoming negotiations, such as full-time safety committeemen, tightened job security, emergency medical technicians, more money for pensioners, and more paid training. If these points are emphasized and limited right to strike is just another item on the shopping list, then peace may

Table 2

SUMMARY OF INCREMENTAL MINIMUM ACCEPTABLE SELLING PRICES FOR SELECTED MINE TYPES

(1978 Dollars per Ton)

	200,000+ Tons (Not Steep)	100,000–200,000 Tons Mountaintop Removal (Steep)	50,000–100,000 Tons Contour (Steep)	0–50,000 Tons Contour (Very Steep)
Appalachia				
Alabama	$2.59	$0.53	$3.82	–
Kentucky (East)	0.75	0.64	1.21	$1.99
Maryland	0.62	0.98	1.00	–
Ohio	0.50	0.99	1.04	–
Pennsylvania	0.62	0.98	1.00	–
Tennessee	0.49	0.53	0.53	–
Virginia	1.98	0.68	2.93	4.40
West Virginia (North)	0.91	0.98	1.70	–
West Virginia (South)	0.66	0.50	1.12	1.82
Midwest				
Illinois	0.41	–	–	–
Indiana	0.67	–	–	–
Kentucky (West)	0.60	–	–	–
Central West				
Arkansas	1.19	–	–	–
Iowa	0.66	–	–	–
Kansas	0.72	–	–	–
Missouri	0.99	–	–	–
Oklahoma	0.97	–	–	–
West				
Alaska*	0.36	–	–	–
Arizona*	0.36	–	–	–
Colorado	0.48	–	–	–
Montana	0.36	–	–	–
New Mexico	0.36	–	–	–
North Dakota	0.27	–	–	–
Texas	0.32	–	–	–
Utah	–	–	–	–
Washington	0.37	–	–	–
Wyoming	0.36	–	–	–

Source: ICF Incorporated.

*Federal coal; nonfederal coal indicated in other states.

Goldman Sach Seminar May 1977

be achieved more easily. Otherwise, all bets are off, and a strike of two months' duration is quite possible. About the only safe assumption one may make is that one request – medical payments for the services of a medicine man on the Navaho reservation – will not be honored.

ICF AND CONGRESS – OBJECTIVE ANALYSIS VERSUS POLITICS

Those coal-oriented provocateurs at ICF Incorporated have just completed a mammoth 555-page study for the Council on Environmental Quality and the Environmental Protection Agency entitled *Energy and Economic Impacts of H.R. 13950 ("Surface Mining Control and Reclamation Act of 1976," 94th Congress).* Although the press has commented liberally on its summary remarks, a copy has just become available to us. In essence, ICF was assigned the task of estimating the various economic impacts of strip-mining legislation, which Congressional supporters are determined to ram through as soon as possible; at this point their chances look rather good.

Fire in the Capital

One might quarrel with some of the methodology, but ICF's work suggests that the economic effects, as defined within several categories, are within tolerable limits. Its attempt at maximum objectivity could not prevent some Congressional opponents such as Senator Orrin Hatch of Utah (a state with only deep mining, incidentally) from claiming that the material was doctored and colored to reach predetermined conclusions. Yet the firm routinely submits rough drafts for outside comment. Sadly, you simply aren't anybody in Washington unless your probity and ethics are questioned; even then, there is no guarantee that you are, in fact, somebody. In short, an altruist can have a difficult time in the bureaucracy of our nation's capital.

Our commentary will cover two subjects: a review of ICF's findings on the surface legislation and a projection of spot steam coal prices by regions through 1981, along with pertinent observations. By and large some governors can claim that a strip-mining bill is of limited value because of existing legislation in their areas. On the other hand, this assuredly does not apply to all states. In general terms, the act creates few cost-related provisions for western states other than a $0.35-per-ton levy for the establishment of a national land bank restoration fund. In Appalachia the central and southern portions (particularly Virginia, Kentucky, and Alabama) would absorb a heavy burden.

Surface Legislation

Minimum Acceptable Selling Prices

ICF established a term called the minimum acceptable selling price (MASP), defined as the lowest price requisite for an operator to either continue or initiate production. In 1978 dollars the rise in the minimum acceptable selling price should be less than $1.50 per ton for full compliance; for half of the coal-mining states, the estimate would be $0.75. Alabama and Virginia face the greatest problems. Their average cost might be elevated $2.00 and in some instances $4.00, owing to less stringent existing laws and steep slopes or thin coal seams, or both. To relate these numbers to 1976 dollars, a deflation factor of 6% per annum would be in order to adjust for inflation. In central Appalachia (eastern Kentucky and southern West Virginia), the higher costs are mainly a function of supplemental regrading requirements in the presence of very steep slopes. Table 2, page 6, shows ICF's state-by-state calculations.

Economic Impacts

Although additional costs are on one side of the equation, the ability to pass these costs on to consumers is on the other. On balance a $1.00-per-ton increase is foreseen in Appalachia and the central West by 1979, if not before, plus a $0.50 lift in other regions. The most extreme case would be $2.00 in some sections of Appalachia. If these price increments go into effect in 1978, net production curtailment would be about 7 million tons – ICF's judgment – whereas if there is no 1978 price adjustment, the loss could be 22 million tons for all of Appalachia. In either case, within one to two years at the latest, additional output should be forthcoming to offset any forced "retire-

Table 3

NET PRODUCTION CURTAILMENTS IN 1978

(Millions of Tons per Year)

	Low Sulfur	Low Medium	High Medium	High Sulfur	Total*
A $1-per-Ton Price Increase					
Northern Appalachia			2.4	(6.2)	2.4
Central Appalachia	0.2	0.4	2.3	(3.3)	2.9
Southern Appalachia		0.2	1.4		1.6
Midwest				(1.9)	
Central West				(1.9)	
Rest of Country					
National Summary*	0.2	0.6	6.1		6.9
No Price Increase					
Northern Appalachia		0.6	3.7	8.0	12.3
Central Appalachia	0.6**	1.3	5.5	0.7	8.1
Southern Appalachia		0.2	1.4		1.6
Midwest				(1.9)	
Central West				(0.6)	
Rest of Country					
National Summary*	0.6	2.1	10.6	8.7	22.0

Source: ICF Incorporated.

*Sum of positive deficits because it is assumed surpluses in one region could not be used to offset deficits in others.

**This coal would possibly be sold on the metallurgical rather than the low-sulfur steam market. If so, market prices would likely be higher, and mine closings would not occur.

ments." Virtually no price elasticity for demand could be ascertained within this range of price variations.

Table 3, page 8, delineates the effects under each of the two scenarios in terms of four categories: low-sulfur, low-medium, high-medium, and high-sulfur. Low-sulfur, or new-source compliance coal, would be less than 0.72% sulfur at 12,000 Btu's per pound. (Add or subtract 0.06% sulfur for each 1,000-Btu change to maintain the ratio.) Assuming the same Btu's, low-medium would be up to 1% sulfur, high-medium to 2%, and high-sulfur to over 2%.

Examining the worst case, about 2.7 million tons of 1% and under sulfur, including 600,000 tons of compliance coal, would be eliminated. In the best case, 800,000 tons would be involved (200,000 tons of compliance). High-sulfur coal would absorb most of the impact. In terms of employment losses, which would be temporary, the figure is 1,400 jobs, allowing for new positions created by reclamation, on a worst-case basis — a far cry from the fictitious 56,000 number advanced by the Federal Energy Administration several years ago. On the subject of reserves, the impacts might be 8.1–24.0 billion depending on assumptions (1.9–5.5% of total reserves), but there would be no effect on coal-mining costs or regional distribution before the mid-1980's at the earliest.

Alluvial Valley Floors

Special attention is devoted to alluvial valley floors, which are defined as "those unconsolidated deposits formed by streams and meanders where either the ground water level is high enough to permit subirrigation or where flood stream flows can be diverted for flood irrigation." This subject has created much discussion. In essence, the consulting firm does not believe that proper environmental protection of alluvial valley floors will cause major disruptions in western mining.

Using various cases, it concludes that a moderate scenario would affect mining through delays, revisions, or curtailments at four locations representing 12 million tons per year in 1978, while the greatest impact would be 25 million tons. ICF finds credible the National Coal Association's view that there are definite flaws in the language on this subject, which could easily be misinterpreted — with material adverse consequences, in our judgment. This applies to a number of other points, as well.

Steep-Slope Mining

Particular attention is paid to extremely steep slopes (over 35–37 degrees), which exist in parts of Virginia, southern West Virginia, and eastern Kentucky. Very steep-slope mining will be permitted only where mountaintop removal is acceptable (contour mining would thus be unacceptable), for at these extreme slopes, regrading to approximate original contour is technically unfeasible. After making allowances for approved mountaintop removal methods, ICF finds that the restriction on *reserves* might be 140-240 million tons. Falcon Seaboard's J.L. Jackson, a pro on this subject, strongly feels the bill's complicated language could make even mountaintop mining impossible. Also, there must be exemptions on return to approximate original contour in this geographic area.

In general, it appears to us that, if the act's language is carefully clarified to remove areas of dubious interpretation and if the contour and mountaintop removal aspects are both clearly delineated and comprehended by sponsors, the bill could meet our original objective and be regulatory but not punitive. Our major concern at present is the speed with which Congress is attempting to move, which may mean that all aspects will not receive the thorough attention they merit. ICF's work represents a major contribution, if only to aid an ill-informed Congress, assuming it chooses to do its homework and not merely become entrapped in environmental fervor.

A Guide to Estimating Spot-Market Coal Prices

Particularly fascinating was ICF's effort to forecast spot-market prices through 1981, although this was no more than an application of methodology and projections are not purported to represent the actual spot price at a particular future point.

The Variable-Cost Assumption

The initial premise is that in surplus markets spot prices would be bid down to a level that would cover variable but not fixed costs and profits, which may or may not be valid. Since such a

Goldman Sach Seminar May 1977

condition ostensibly existed in 1976, that year served as a base, which would theoretically apply to underground, as well. Further, constant productivity and mining costs not in excess of the general inflation rate as a result of the UMW settlement are implicit. Diversion of marginal metallurgical coal into the steam-coal market tends to depress the price for low-sulfur coals from southern West Virginia's field. The premiums for compliance coal should become more apparent, once the metallurgical market firms up.

The Role of Fixed Costs

ICF assumes that spot prices in a balanced — not surplus — market will approximate full cost for new mines opened in that year and that the variable component will be 1976's regional spot prices. Three factors are encompassed in its analysis: One is a fixed-cost adjustment, or a capital factor that includes depreciation, depletion allowance, interest, taxes, and return on equity. The premise obviously is that no mine would be opened unless both variable and fixed costs (return on equity is part of the firm's unconventional definition) were covered. ICF then estimates that fixed costs — its terminology — are about one-third of variable costs, or about 25% of the full cost, for eastern and some interior mines and 50% of variable costs, or 33% of full cost, for western and the remaining interior mines.

As a rule, we believe fixed costs in the purest sense are generally 25—30% in the average large strip or underground mine — that is, 500,000 tons or more. In this instance, they would be 33—42% of variable costs. If aftertax profits under varying assumptions are included in fixed costs, the latter then become a larger percentage of the total and variable costs become smaller, so that fixed (including return on equity) range between 35% and 50% of variable, thereby coinciding with ICF's conclusion.

The other two elements are inflation, estimated at 6%, and a depletion factor for each area, related not to mine retirements but rather to depletion of the reserve base. The components used for each region are presented in Table 4, below. In the northwestern Great Plains (the Powder River Basin), where there was no 1976 surplus, there is a deviation in that the variable costs of mines are assumed to be full-cost price, thereby including capital-cost recovery.

Scrubbers, according to ICF, may add $12 a ton to the cost of coal. Spot coal in the high-sulfur market — in surplus because of EPA standards — will basically be priced on variable costs through 1980 and should not differ from low-sulfur coal in 1976 and 1977, it is concluded. This, of course, is an oversimplification, already invalidated by this winter's record low temperatures. At any rate, variances become very apparent in 1978, mainly reflecting the scrubber differential, and then widen materially each year thereafter as high-sulfur output is constrained by EPA regulations. Table 5, page 11, reveals ICF's findings.

Table 4

BASE PRICES FOR 1976 AND FACTORS INFLUENCING SPOT-MARKET PRICES FOR EACH PRODUCING REGION

Producing Region	Inflation Factor	Depletion Factor	Capital Factor	Base Price for 1976*
Northern Appalachia	6.0%	1.4%	33.0%	$15.00
Central Appalachia	6.0	1.1	33.0	14.00
Southern Appalachia	6.0	1.4	33.0	16.00
Midwest	6.0	1.0	50.0	12.00
Central West	6.0	0.5	33.0	17.00
Northwestern Great Plains	6.0	2.5	50.0	7.00
Rockies	6.0	1.2	50.0	15.00

Soutce: ICF Incorporated estimates, based on market prices published in news periodicals.

*All base prices are assumed to be at about the producing region's mine variable costs except for the northwestern Great Plains, which is assumed to be a full-cost price — i.e., including recovery of variable as well as capital costs.

Goldman Sachs Seminar May 1977

Table 5

ESTIMATED SPOT-MARKET PRICES FOR SPOT PRODUCING REGIONS*
(In Current Dollars)

Producing Region	Sulfur Level	1976	1977	1978	1979	1980	1981
Northern Appalachia	Low	$15.00	$21.44	$23.05	$29.77	$36.63	$43.62
	Low–Medium	15.00	21.44	23.05	26.77	31.63	36.62
	High–Medium	15.00	21.44	23.05	24.77	26.63	28.62
	High	15.00	21.44	17.09	18.11	19.20	27.45
Central Appalachia	Low	14.00	19.95	21.38	27.92	34.56	41.32
	Low–Medium	14.00	19.95	21.38	24.92	29.56	34.32
	High–Medium	14.00	19.95	21.38	22.92	24.56	26.32
	High	14.00	19.95	15.90	16.86	17.87	25.47
Southern Appalachia	Low	16.00	22.87	24.58	31.42	38.40	45.53
	Low–Medium	16.00	22.87	24.58	28.42	33.40	38.53
	High–Medium	16.00	22.87	24.58	26.42	28.40	30.53
	High	16.00	22.87	18.23	19.32	20.48	29.28
Midwest	Low	12.00	19.27	20.63	27.09	33.65	40.32
	Low–Medium	12.00	19.27	20.63	24.09	28.65	33.32
	High–Medium	12.00	19.27	20.63	22.09	23.65	25.32
	High	12.00	19.27	13.62	14.44	15.30	24.57
Central West	Low	17.00	24.09	25.66	32.33	39.12	46.02
	Low–Medium	17.00	24.09	25.66	29.33	34.12	39.02
	High–Medium	17.00	24.09	25.66	27.33	29.12	31.02
	High	17.00	24.09	19.20	20.35	21.57	30.56
Northwestern Great Plains	Low	7.00	7.61	8.26	8.98	9.75	10.60
	Low–Medium	7.00	7.61	8.26	8.98	9.75	10.60
	High–Medium	7.00	7.61	8.26	8.98	9.75	10.60
Rockies	Low	15.00	24.14	25.89	27.77	29.79	31.96
	Low–Medium	15.00	24.14	25.89	27.77	29.79	31.96
	High–Medium	15.00	24.14	25.89	27.77	29.79	31.96

Source: ICF Incorporated.

*Prices may be estimated beyond 1981 by multiplying the previous year's price times the appropriate inflation and depletion factors for each producing region.

Table 6

SOURCES OF APPALACHIAN COMPLIANCE COAL FOR UTILITIES, 1974

(Millions of Tons)

	Long-Term Contract	Spot	Total
Alabama	–	–	–
Eastern Kentucky	12.8	4.9	17.7
Pennsylvania	1.3	0.6	1.9
Tennessee	1.1	0.7	1.8
Virginia	6.6	3.2	9.8
Northern West Virginia	3.0	0.3	3.3
Southern West Virginia	30.4	2.6	33.0
Total	55.2	12.3	67.5

Source: Federal Power Commission.

Table 7

ESTIMATED 1978 PRODUCTION OF COMPLIANCE COAL IN APPALACHIA

(Millions of Tons)

	New Mines	Existing Mines	Total
Alabama	–	–	–
Eastern Kentucky	3.6	23.0	26.6
Pennsylvania	0.4	1.4	1.8
Tennessee	0.4	1.7	2.1
Virginia	2.5	12.6	15.1
Northern West Virginia	0.9	5.7	6.6
Southern West Virginia	5.5	33.1	38.6
Total	13.3	77.5	90.8

Source: ICF Incorporated.

Compliance Coal and the Metallurgical Market

We have constructed Table 6, page 12, from raw ICF data, obtained from the Federal Power Commission, which reveal utility use of Appalachian compliance coal in 1974 (last available figures). Southern West Virginia and eastern Kentucky dominate, followed by Virginia. Northern West Virginia is largely high-sulfur.

Table 7, page 12, contains excerpts from ICF's computations on compliance coal forecast to be produced in Appalachia in 1978, but breakdowns by sulfur content are related to various shares of the whole, as contained in 1974 data. Unfortunately, the total includes metallurgical, all of which is assumed to have a secure home, but for which exact separations by sulfur can only be estimated. Note that all coking coal is assuredly not compliance — for example, 0.9% sulfur at 14,000 Btu's. The table indicates only *sources* of compliance coal but not that available to utilities. Most of the differences between totals in Tables 6 and 7 consist of coking coal, and no data are constructed to isolate its exact components. Hence, the incremental amount allocable for utilities is probably minor.

Raise the Limits for Compliance Coal

Perhaps the most important point is that operators with compliance steam coal — that is, not destined for the pure metallurgical market — can confidently expect a premium for their wares in the years ahead. Seeing this type of price development, it follows that the diversion of marginal metallurgical coals into the compliance steam coal market, assuming sulfur standards can be met, is inevitable. Our research strongly suggests that metallurgical coal, excluding low-volatile, will be more than ample for the rest of this decade, barring possible spot shortages caused by extended labor disturbances.

It is also our conviction that the economics of western coal, particularly transportation, will not permit that product east of Ohio. If there is one realistic component necessary to ensure the role of coal in our total energy picture, it will be raising the sulfur limits of compliance coal to the level of 1% at 12,000 Btu's. This will not happen in 1977, but if it does not occur eventually, the coal industry will be relegated to its former black-sheep position. Meanwhile, would you believe the EPA has under advisement a proposal to *tighten* sulfur standards by having a set reduction everywhere, irrespective of compliance aspects?

COMPANY COMMENTS

MAPCO Inc.

MAPCO, which is being added to our full-coverage list, is the subject of a just-released Dean Witter Company Analysis, dated March 18, 1977. Our comments here are thus confined solely to the coal operations of that company.

The names of MAPCO's coal entities contain the suffix "tiki," which means good luck in Polynesian. This practice began in early 1971 with the acquisition of Webster County Coal, which operated the Dotiki mine in western Kentucky — named after Dorothy, the former girlfriend of Joe Davis, who was then the owner. The next addition, also in Kentucky, was Goldsberry Coal in late 1971, which was designated Retiki after Robert E. Thomas, MAPCO's chief executive. Then, in early 1973 options were acquired on 18,000 acres of coal property in eastern Kentucky from a subsidiary of the Norfolk & Western Railroad. This later provided two further mines, Martiki (Martin County) and Pontiki (the Pond Creek seam).

In 1974 came an epochal event. The bulk of Dotiki's output was dedicated to the Tennessee Valley Authority under a 1966 contract that was not renegotiable until the cumulative cost of living rose 50%. As destiny would have it, that occasion occurred in early summer of 1974, one of the most frenetic periods in the history of the coal industry; several months thereafter the price of 1.45 million tons to TVA soared from $7.81 to $28.50 — both figures before severance tax — an add-on of almost $27 million to MAPCO's annual pretax earnings, or perhaps $0.90 per share. In 1974 the company also picked up the mining rights to a metallurgical property (Mettiki) from the Western Maryland Co., a subsidiary of the Chessie System.

Goldman Sach Seminar May 1977

Perhaps the most distinguishing characteristic of MAPCO's activities are its nonunion nature and remarkable productivity. At Dotiki it reached an amazing 36 tons per man-shift *underground* in 1976, contrasted to a national average of 8.5 tons. The men participate in production gains in the form of bonuses, as well as profit sharing, pension contributions, and sickness and accident benefits. The average MAPCO miner earned about $20,000 in 1976 before benefits.

A few comments seem in order on the individual mines:

Dotiki. This is a western Kentucky high-sulfur mine, where as a result of the TVA renegotiation, we estimate profit for that particular contract in 1976 was around $21.00 a ton, which may rise to $21.70 in 1977. We might point out that the escalation provisions with TVA state that productivity is predicated on 20 tons per man-shift, whereas MAPCO was actually 16 tons higher in 1976. It should also be noted that this contract, which is $34.33 FOB mine today, expires on September 26, 1979. It is unlikely to be renewed, particularly since TVA is under pressure to use lower-sulfur coals to meet emission standards; hence, our projections assume that this coal will then be marketed for $20 a ton, or about $14 less.

Retiki. This operation produced around 900,000 tons last year for a single purchaser, Big Rivers Electric. It is also a high-sulfur, western Kentucky mine, with productivity of 24 tons per man-shift. We estimate that profit may have been about $1.50 per ton in 1976 on a selling price of $10.60 FOB mine, which is rather remarkable.

Martiki. This mine, which initiated production in late 1974, is expected to be up to a capacity rate of 3 million tons in the latter part of 1977. It is a unique strip operation for eastern Kentucky in that it will include the use of a Marion 8200 dragline, together with Marion power shovels and huge Unit Rig trucks. The terrain there does not lend itself to dragline operations, but rather to road-building equipment, so MAPCO is indeed a maverick. This coal is generally under 1% sulfur and 12,500 Btu's and is sold under contracts, two-thirds of which are 20-year agreements with Detroit Edison and Monongahela Power.

In the buildup stage, the company has arranged commitments with local miners to purchase washed coal for delivery under its own contracts, which resulted in more-than-satisfactory profits in 1976. Purchased tonnage will actually rise this year, although we have built in a somewhat lower profit rate. It is questionable what these operators will do, given a stronger market. On the other hand, sale of such coal is difficult without washing, of which there is a paucity in the area.

Pontiki. This is an underground operation, next to Martiki, which will have two mines. The first is 1% sulfur, and the second, expected on-stream in early 1979, will be 0.5% sulfur. When blended, it will form a superior compliance coal and hence be the beneficiary of the type of pricing structure alluded to in the earlier section on spot prices. Pontiki, somewhat remarkably, was on profit and loss before the first 100,000 tons were produced and is budgeted to reach output of 600,000 tons in 1977, 1.0 million in 1978, 1.5 million in 1979, with maximum profitability expected in 1980, when the compliance coal is available for an entire year.

Mettiki. This Maryland mine will combine metallurgical and steam output with 95-inch seam thickness, which offset possibly difficult mining and roof conditions. Minimal production will begin this year but not peak until 1981 at 1.8 million tons. The metallurgical component is low-volatile, which although relatively high in sulfur (1.1%), possesses a superior coke button at 9.0–9.5, low ash at 6.7%, good coke yield, excellent shatter strength, and an impressive composition balance index – a key Japanese measurement.

With reference to that country, it is believed a contract will be shortly consummated at a price very close to that of Keystone (Eastern Gas & Fuel) and Itmann (Consolidation Coal). It will only be for a portion of the output, the remainder of which is unsold. It may be a blessing that full capacity is several years in the future, since a healthy market does not now exist for almost any type of metallurgical coal.

What Does It All Add up to?

In our judgment MAPCO earned about $45 million before taxes from its coal operations in 1976, on revenues of $97 million. Our calculations show a progression to $65 million in 1977, $82 million in 1978, and $98 million in 1979. In 1980 there should be a leveling owing to expiration of the TVA contract, although we believe additional property will be acquired with tonnage on-stream in that year to allow extension of coal growth.

All in all the MAPCO coal story is extraordinary; in most coal operations, one never knows from one year to the next how to calculate earnings. Although there is no assured formula for MAPCO, it is indeed simplified and enhanced by the absence of a union. As a frame of reference, production was 3.2 million tons in 1975 and is budgeted to reach 8.8 million tons in 1980 in progressive steps.

Pittston — An Abortive Move to Deploy Cash; Metallurgical Disarray

Pittston recently indicated its intention to acquire Elgin National Industries in a two-step cash transaction aggregating $59 million. Elgin's major division is Roberts & Schaefer, which, with McNally-Pittsburg, controls the lion's share of the coal preparation equipment market. R&S has served all major domestic coal companies and perhaps 90% of the minor entities requiring washing of coal (sulfur and ash removal). Although coal washing is in ascendancy, backlogs have been reduced over the past year and incoming orders have slowed, reflecting the lackluster nature of the coal business.

Elgin may earn $8.2 million in 1977, up perhaps 5% from 1976, when sales aggregated $173 million. This allows for downtime resulting from a UMW strike in December. Deducting an interest component on the purchase price, the add-on for Pittston on a 12-month basis might have been $6.4 million, or $0.18 per share, except for one problem: The merger conversations have been terminated for undisclosed reasons; Pittston's cash horde remains untouched.

Weather and wildcats (the latter a spillover from Eastern Gas & Fuel) have now seemingly assured that our worst-cast analysis for the first quarter (see *The Coal Observer,* of January, 1977) will be nearer reality. Production was 1.1 million tons in January, and shipments were 100,000 tons lower; February showed a moderate pickup. For the period 3.6 million is our new output target, down from a lackluster 4.4 million a year ago. Profits may be $0.70 per share contrasted with $1.03; a big lift in oil will mask the severity of the decline.

The "met" business is dreadful at present. Only Egypt and Turkey seem interested in any additional coal, and the Japanese have notified Pittston that none of the option tonnage will be taken. Further, the Japanese have indicated a need for only half of the *variable* contract portion from both Consolidation Coal and Eastern Gas & Fuel and in fact have first requested a $1-per-long-ton paring in price from Consol, which appears amenable to lowering the price on the *fixed* segment of its Rowland brand, while the variable has been eliminated.

There are negotiating ploys involved vis-a-vis the Australians, but this does not speak well for Japan's steel health. The steel companies are lowering their expectations to about 25.7 million metric tons for this quarter — almost 10% below the December period — and no upturn is anticipated in the ensuing three months. Pittston's marketing efforts have intensified in Brazil, Mexico, and South Korea.

Two Diverse Forecasts

So it was all the more remarkable when we came across an analysis of Pittston estimating $6.00 per share for 1977, higher than it had ever earned before; our number is $3.40. That forecast was predicated on growth in worldwide steel production of 5.0–7.5% in 1977; if lower, $4.00 or less per share was suggested as more appropriate for 1977. Considering other factors such as inventory accumulation (decumulation has been the pattern for the first two months), Pittston should be viewed as having two-year earnings power of $11.00 per share. This implies the possibility of $7.00 in 1978 (our *ceiling* would be $4.50).

The analyst targets shipments in 1977 at 21.5 million tons — with 2.0 million purchased; we are carrying 17.0 million (1.0 million purchased) — management's current belief. Japan's acceptance is set at 8.5 million tons; our figure is 6.0 million or less (including separate tonnage for Kobe Steel). Strikes — presumably an industry shutdown and not wildcats — are not factored in. Our calculations encompass this virtual inevitability.

Goldman Sachs Seminar May 1977

Compliance Steam Coal for Pittston?

We have been strongly convinced for some months that marginal and, in some cases, fairly good high-volatile metallurgical coal would help fill the "shortage" of compliance, high-Btu steam coal in the years ahead. Apparently, Pittston is in agreement; it has been exploring the possibility of opening several mines directed toward the compliance coal market. Since the start-up times may be one to three years, it can be assumed that these are drift and not shaft in nature. Whereas the percentage share of metallurgical was budgeted in company planning to increase, this will not be the case; rather the metallurgical component is likely to dip under 70% by the end of the decade.

We like Pittston as a company but suggest investors take a rain check on the stock.

Eastern Gas & Fuel – Weather and Wildcats

Eastern is completing an action-packed quarter, with more bad news than good news. First for the good news: Shivering temperatures have been a boon for Boston Gas. Earnings might rise 20% in the opening three months.

Now for the bad news: The Ohio River froze for the first time in 30 years, bringing traffic to a total standstill. Each day, of course, spelled a loss. The company's river activities have returned to normal, and fortunately, its vessels escaped damage. At one point we worried about a profit; the barge sector, however, should be solidly in the black, albeit down perhaps 50–60% from the $4.9 million of 1976's initial quarter. Management believes some of the shortfall can be made up in subsequent periods.

Coal operations actually held up pretty well in January, considering the weather ravages – 537,000 tons, or almost three-quarters of normal. However, February has brought the bizarre wildcats, discussed in detail on pages 3 and 4, and a reduction to the 400,000-ton level.

Hence, for the quarter something on the order of $0.75–0.80 per share seems in order, down from $1.12 in 1976. With anticipated gains in the middle two periods but a strike-affected final three months, Eastern's five-year progression of higher earnings may come to an end in 1977 – but not without a fight. Our estimate is $2.90 (versus $3.01), with a sizable lift in store for 1978. The shares represent a strong hold, and purchase should be confined to periods of weakness.

Westmoreland Coal – Fourth-Quarter Profit Erosion Raises Questions

When Westmoreland released final-quarter figures, the bottom line was right on target; results above the bottom line concerned us, though. The anticipated tax rate of 25–26% emerged at 19%; hence, pretax profits and profit per mined ton were markedly lower than expected. We thus estimate that mined-ton realizations dropped one-third from those of the first three months – around $8.40 to perhaps $5.55 – on identical output.

Some falloff owing to unabsorbed escalation was assured, as for others, and each of the two portions of the Duke Power contract was renegotiated downward. However, this explanation is insufficient. There was apparently some other price shading, and costs seemingly "did their own thing." The real bottom line is that we no longer believe potential 1978 earnings power is $7.70–8.00 but now project $7.00.

As for the current period, weather, combined with customer preference for lower coking-coal shipments (a delicate expression indeed), may allow only moderate profits. Two metallurgical divisions were shuttered for three weeks, while low-volatile Winding Gulf operated only partially during this time frame.

For all of 1977, earnings seem unlikely to exceed $3.60 per share (large investment tax credits create uncertainty in the tax rate), which places the company's multiple substantially out of line with those of others. However, the magnitude of interest in the coal group, particularly metallurgical, is unfathomable at times. Although selling holdings would seem in order, we would *not* counsel anything more drastic – for example, short sale.

Falcon Seaboard – Increased Reserves, Compliance Coal

Three recent announcements have tended to enhance the earnings visibility of Falcon Seaboard, while one has solidified its credibility:

Release of a Paul Weir study delineating recoverable reserves of 142 million tons compares with company estimates a year earlier of 70 million. Add to that another 40-plus million tons of low-sulfur coal currently under option, and that spells reserve credibility.

Now consider that TVA is under intense, and probably irresistible, pressure to use compliance coal or scrubbers at four facilities and to reduce its sulfur emissions at most others – meaning, for practical purposes, blending with lower-sulfur coals. Falcon has uncovered a 50-million-ton reserve of the Haddix seam, which washes down to 1.5% sulfur and can be mined (mid-1979 production) from the outcrop.

This is tailor-made to alleviate TVA's problem, and in fact the giant utility has expressed interest not only in Haddix but also in extending its basic contract, expiring in 1981, for another four to five years. Only preliminary talks have been held, but it seems to us some kind of standby fee or pricing adjustment is likely for committing needed tonnage, in view of the very low existing contract price of around $13.85.

Then in the 40-plus-million-ton reserve, core drillings by Falcon suggest half or more will fall in the category of compliance coal – that is, 0.7% sulfur at 12,000 Btu's. Plans are being drawn for perhaps 1 million tons of annual washed output in mid-1979. One-third of the reserves will be strip-mined, and given the increasingly strong market for such coal, a profit potential of $8-plus per ton, or $8 million per year before taxes, is very realistic.

In the Dutch North Sea, a fourth well has been announced, which will be hooked up with a third in early 1979. Earnings from this source could be $5 million before taxes in 1979, versus $2.5 million in the current year. These three items spell visibility – the stuff of higher multiples and prices.

A First-Quarter Downer

Meanwhile, frigid weather and a strike relating to improper release of 12 men for one day owing to frozen equipment and inadequate railroad cars will make the first quarter a mishmash. Perhaps $0.35 per share versus last year's $0.83 is possible. Receipt of a 200,000-ton short-term contract from Georgia Power to be handled through a contractor will allow a partial offset in later periods, so that $4.45 per share is attainable for 1977 contrasted with $4.16 and $3.43 in each of the past two years.

Falcon is looking for substantially higher earning power in the years ahead. The shares of this largely low-sulfur, model strip-mine reclaimer, and, most important, nonunion coal producer face a bright market future, in our judgment.

North American Coal – The Potential of Lignite

North American Coal has been setting new highs for reasons not readily apparent. Earnings do not appear to be the root; the freezing winter subtracted some 500,000 tons, which, coupled with tough-nosed utility positions on escalation pass-throughs and a December strike, will bring full-year results down to perhaps $3.80 per share versus $4.37 in 1976. At 13.9 the multiple is one of the highest around, an anomaly considering that practically all of North American's current output is midwestern high-sulfur coal, either on a fixed price plus escalation or a cost-plus basis.

The attraction must be in North Dakota lignite, for which there are two arrangements: one with Minnesota utilities, which will add 2.6 million tons of lignite in each of 1979 and 1980, and another with Basin Electric that furnishes similar amounts in 1981 and 1984, or an aggregate exceeding 10 million tons. This might generate incremental profits of $0.50 per share in each of 1979, 1980, and 1981.

The company also controls 200 million tons of lignite in Texas, which might lend itself well to a utility joint venture. In addition, an agreement has been inked with American Natural Resources of Michigan; North American is commissioned to find Appalachian compliance coal and perform the mining, and American Natural will play banker. Of course, compliance coal is not an easy commodity to locate in quantity.

So all in all, interesting events are occurring at North American, even if market exuberance has outrun realities in a quest for steam-coal participation. Considering its extensive reserve position, a friendly takeover cannot be ruled out.

JP
3/24/77

For further information please call (212) 437–4922.

Table 8

SELECTED COAL COMPANY DATA

Company	3/24/77 Price	Earnings per Share 1975	Earnings per Share 1976	Earnings per Share 1977E	P/E Ratios 1976	P/E Ratios 1977E	Ind. Div.	Current Yield
Eastern Gas & Fuel	$29	$2.73	$3.01	$2.90	9.6	10.0	$0.80	2.8%
Falcon Seaboard	45	3.44	4.16	4.45	10.8	10.1	1.00	2.2
MAPCO, Inc.	45	2.64	3.00	3.70	15.0	12.2	1.10	2.4
North American Coal	53	4.71	4.37	3.80	12.1	13.9	0.90	1.7
Pittston Co.	35	5.36	3.91	3.40	9.0	10.3	1.25*	3.6
Westmoreland Coal**	53Ask	8.82	7.07	3.60	7.5	14.7	1.60*	3.0

---

*Includes extra. **Dean Witter & Co. Incorporated makes a market in this over-the-counter security.

DEAN WITTER & CO. INCORPORATED

RESEARCH DEPARTMENT

Director of Research Forest Products	Edmund C. Puckhaber, CFA, Senior Vice President
Associate Director of Research Administration	Victor J. Raskin, CFA, First Vice President
Chief Economist	Arnold X. Moskowitz, Vice President
Editor-in-Chief	Daniel N. Reissig, Assistant Vice President
Librarian	Julia Shibla, Assistant Vice President
Autos and Related Areas	Joseph S. Phillippi
Banks	David L. Rothgaber, Vice President
Chemicals, Textiles	Graham R. Stellwagon*
Coal, Special Situations	Joel Price, CFA, Vice President
Food and Beverages	Richard D. Sondheim, CFA
Insurance	Michael J. Morrissey, Vice President
Lodging, Restaurants, Mobile Homes, Leisure	Victor J. Raskin, CFA, First Vice President
Machinery	James R. McCann
Mainframe Computers, Office Equipment	Mort Shepetin, Vice President
Minicomputers, Peripherals, Instruments	George W. Potts
Petroleum	Robert H. Hinckley, III
Retail Trade	Desmond J. Heathwood, CFA
Semiconductors	Mark C. Dyniewicz**
Special Situations	Charles J. Nicolosi
Technology	L. Duane Kirkpatrick, Vice President**
Utilities	Kenneth Hollister, CFA, First Vice President
Utilities	Charles W. Schelke, CFA, Vice President
Western Banks, Savings and Loan Companies	Jerry Gitt, CPA, Vice President**
Western Companies	Leonard G. Collins, CFA, Vice President**
Western Companies	Thomas A. Elliott, Jr.**
Western Companies	David E. J. Maxwell**
Western Companies	William D. Tichy**

*Wilmington, Delaware
**San Francisco, California

Goldman Sachs Seminar May 1977

Investment Research

Goldman
Sachs

Railroad Review

Erratic Earnings Extend into First Quarter
Strongest Earnings Gain of Year Expected in Second Quarter
Rate Increase Pattern Favors Western Railroads in 1977

Michael R. Armellino

April 19, 1977

This material is for your private information, and we are not soliciting any action based upon it. Opinions expressed are our present opinions only. The material is based upon information which we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. We may from time to time have a long or short position in, and buy or sell, securities mentioned.

Table of Contents

	Page
Investment Summary	1
Overview	1
Rates	5
Traffic	7
Traffic Mix	9
Expenses	11
Earnings Summary	14
Coal	17
San Antonio Rate Case	18
Investment Posture	19
Missouri Pacific	22
Southern Railway	23

Investment Research

Goldman Sachs

April 19, 1977

RAILROAD REVIEW

INVESTMENT SUMMARY

On balance, we reiterate our investment posture on rail-dominated companies, recommending that positions be limited to those issues with the demonstrated capability to sustain earnings momentum in a period of less-exuberant economic growth and accelerating inflation. In our view, Missouri Pacific and Southern Railway fulfill such criteria.

Overview

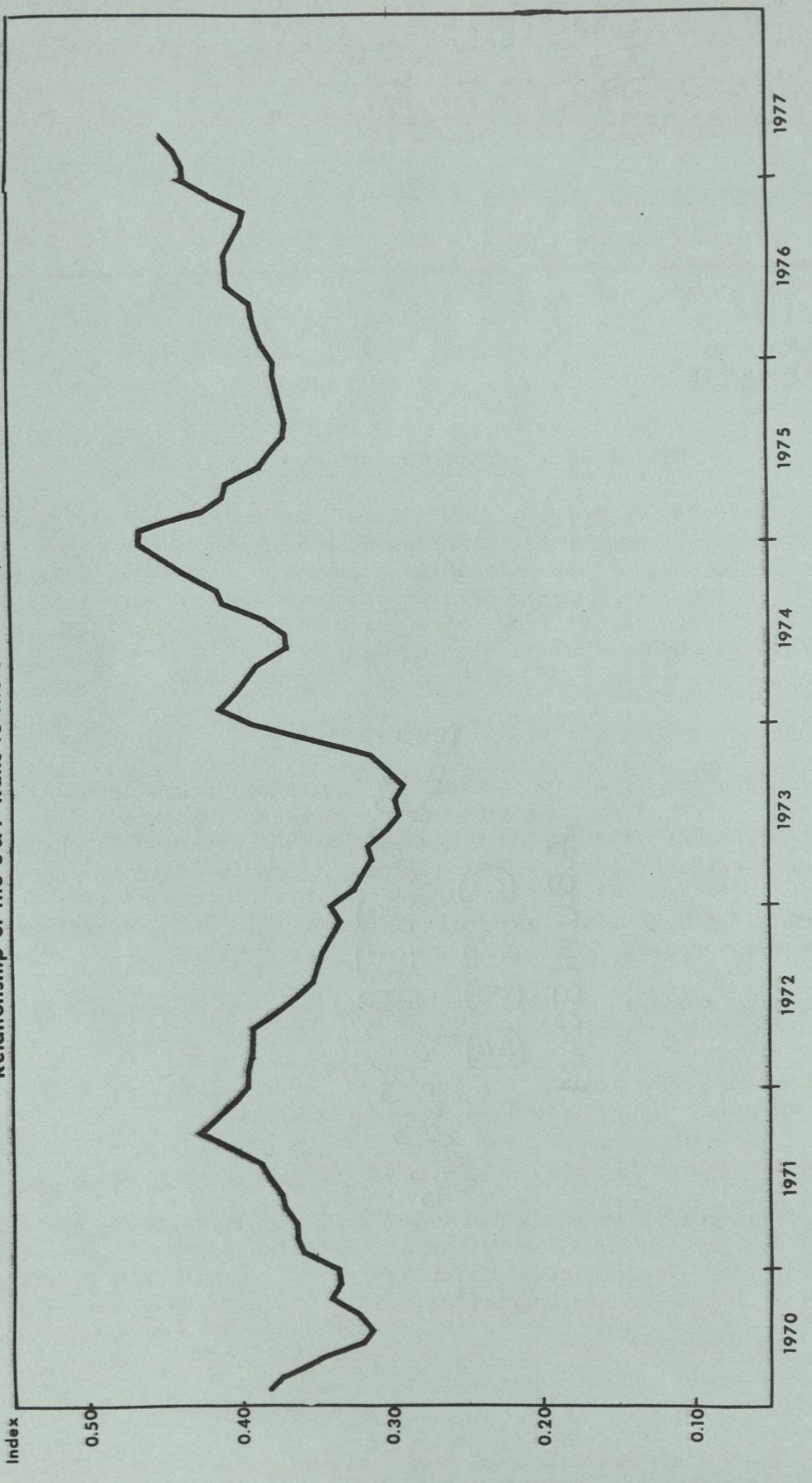
Nothwithstanding the fact that rail earnings comparisons since mid-1976 have been even less favorable than we had expected (see Railroads: Caution, August 1976), rail stocks have outperformed the broad averages. In fact, while the S&P 400 has declined 2% since August, the S&P Rails advanced 14% (see Figure 1). The market performance of rail stocks in the face of erratic earnings since the third quarter of 1976 can be explained by several factors:

- the group's natural resources exposure, particularly with regard to carriage of coal;
- competitive yields in a period of uncertainty in the equity markets and relatively low interest rates;
- the safety of domestic earnings; and
- the generally favorable regulatory and legislative environment that was enhanced by President Carter's appointment of Brock Adams, an architect of important rail legislation in the past, as Secretary of Transportation.

This material is for your private information, and we are not soliciting any action based upon it. Opinions expressed are our present opinions only. The material is based upon information which we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. We may from time to time have a long or short position in, and buy or sell, securities mentioned.

FIGURE 1

Relationship of the S & P Rails to the S & P 400, 1970-1977



Goldman Sachs Seminar May 1977

In 1977, pretax earnings are likely to rise, probably at a rate of about 10% versus the 15% forecast by the Goldman Sachs Economic Research Group for all U.S. corporations. After-tax earnings will reflect the temporary benefits of last year's tax legislation. Gains in the current quarter should be better than at any time since the second quarter of 1976. This expectation reflects the likelihood (1) that year-to-year improvement in business activity will be stronger in the April-June period than at any other interim of 1977, and (2) that the second quarter's increase in compensation per employee will be smaller than at any quarter in the current three-year labor contract. For the full year, we expect earnings of western railroads to generally outperform those of eastern and southern rails; that primarily reflects a distortion among geographical regions relative to the realization of rate increases. Pretax earnings for western railroads should rise at a rate similar to the 15% average forecast for all U.S. corporations, while pretax earnings in the East and South will rise at an estimated 5%-10% rate.

Inflation in rail costs, particularly in the area of labor, will escalate next year, in our view, thereby requiring greater revenue increases in 1978 than in 1977 to maintain earnings momentum. That concern primarily reflects the likelihood that the labor contract to be negotiated effective January 1978 will be front-end loaded and will provide for a wage increase of close to 10% versus a rise of only 7% in 1976. Inflation in material prices is also expected to escalate.

Coal will continue to attract attention, although not all the news will be positive. To no one's surprise, President Carter's energy policy speech on April 20 will emphasize coal development, but the President's proposals are likely to encounter considerable resistance in Congress. We also anticipate a relatively tough strip-mining bill to be legislated this year. Further, eastern and midwestern coal roads are faced with the possibility that labor problems in the coal mines they serve will be more serious than usual since the union election and contracts with management are open issues in 1977.

Finally, over the last six business cycles, rail stocks have peaked an average of 11 months prior to peaks in the general level of business activity. And the S&P Rail average has outperformed the broad averages since mid-1975, and currently is close to its highest relative level in recent years. On balance then, we have not altered our basic investment posture with regard to rail-dominated issues. Those companies that have demonstrated the ability to sustain earnings momentum in the face of a less-than-optimum environment for the industry should perform well. We include Southern Railway and Missouri Pacific in this category.

These two companies offer protection against slowing real economic growth and accelerating inflation rates that would squeeze margins. Both companies enjoy above-average profit margins and traffic growth rates, while participating in rate adjustments determined by rail industry aggregates. Owners of Southern Railway and Missouri Pacific sacrifice some yield relative to holders of several other rail-dominated companies, but in

Table 1

Per-Share Data on Selected
Railroad-Dominated Companies, 1975-1977E

Company	Current Price	Earnings Per Share(a)			P/E Ratio		Indicated Dividend	Yield	1976-1977 Price Range
		1975	1976	1977E	1976	1977E			
Burlington Northern	50	$3.95	$5.35	$7.50	9.3	6.7X	$1.60	3.2%	50 - 32
Missouri Pacific	47	4.17	5.84	6.75	8.0	7.0	1.80	3.8	48 - 23
Santa Fe Industries	39	3.82	4.16	5.00(b)	9.4	7.8	2.00	5.1	40 - 30
Southern Pacific	34	2.81	4.10	4.40	8.3	7.7	2.24	6.6	38 - 30
Southern Railway	57	5.12	5.85	6.50	9.7	8.8	2.32	4.1	63 - 50
Union Pacific	58	3.12	3.91(c)	4.60	14.8	12.6	1.70	2.9	58 - 48

(a) Fully diluted. Missouri Pacific's earnings are before purchase accounting adjustments. Including purchase accounting adjustments, fully diluted earnings totaled $4.79, $6.17, and $5.95 in 1975, 1976 and 1977E, respectively.

(b) Includes estimated 25¢ from sale of land in first quarter.

(c) Before 16¢ extraordinary credit.

Goldman Sachs currently maintains an over-the-counter market in Santa Fe Industries convertible debenture 6¼s of 1998.

In the course of the arbitrage activities of Goldman Sachs & Co., the firm has accumulated a substantial long position in calls for Burlington Northern against which the firm is short Burlington Northern common stock and has sold calls for the common stock. In another arbitrage, the firm has accumulated a substantial long position in Missouri Pacific convertible debenture 8s of 1995 against which the firm is short the Missouri Pacific common stock. Each of the above positions are over $250,000 market value. In another arbitrage, the firm has a small long position in Santa Fe Industries convertible debenture 6¼s of 1998, against which the firm is short the Santa Fe Industries common stock, and has accumulated a small long position in Southern Railway common stock, against which the firm is short Southern Railway $3.00 convertible preferred stock. Each of these positions is under $250,000 market value. In addition, Goldman Sachs & Co. is short over $250,000 market value in Burlington Northern common stock. Any of the above positions may be increased or decreased from time to time.

Goldman Sachs Summar May 1977

a period of rising interest rates and uncertain economic growth (beyond the near term) the tradeoff is worthwhile in our view. (See Table 1 for per-share data on rail-dominated companies we follow.)

Rates

Year-to-year freight rate comparisons favored eastern and southern railroads last year, but the pendulum will shift in favor of the western roads in 1977 (see Table 2). A 7% rate increase (less than 5% adjusted for those commodities on which the increase was only partially taken or not taken at all for competitive reasons) effective last April, was not absorbed by the western railroads until October since Southern Pacific's failure to implement the adjustment on the earlier date precluded other western carriers from participating. All railroads effected another 4% general rate increase in January 1977. Therefore, while railroads across the nation are enjoying about the same rate pattern in the first quarter of 1977, the western roads will have an advantage in the second and third quarters, reversing the April-September 1976 relationship.

The issue of further rate relief in 1977 is a controversial one, not because of any serious concern regarding the Interstate Commerce Commission's (ICC) willingness to grant additional adjustments, but because some railroads have voiced apprehension that further rises in freight rates this year will not be compensatory when measured against the loss of business to other transportation modes. Last January, Robert S. Hamilton, executive vice president of marketing and planning for Southern Railway, stated emphatically that Southern would not participate in further general rate increases this year. Southern is undoubtedly in a position to preclude a major portion of the industry from raising rates again in 1977; however, we do not believe that Mr. Hamilton's statement was intended to be irreversible.

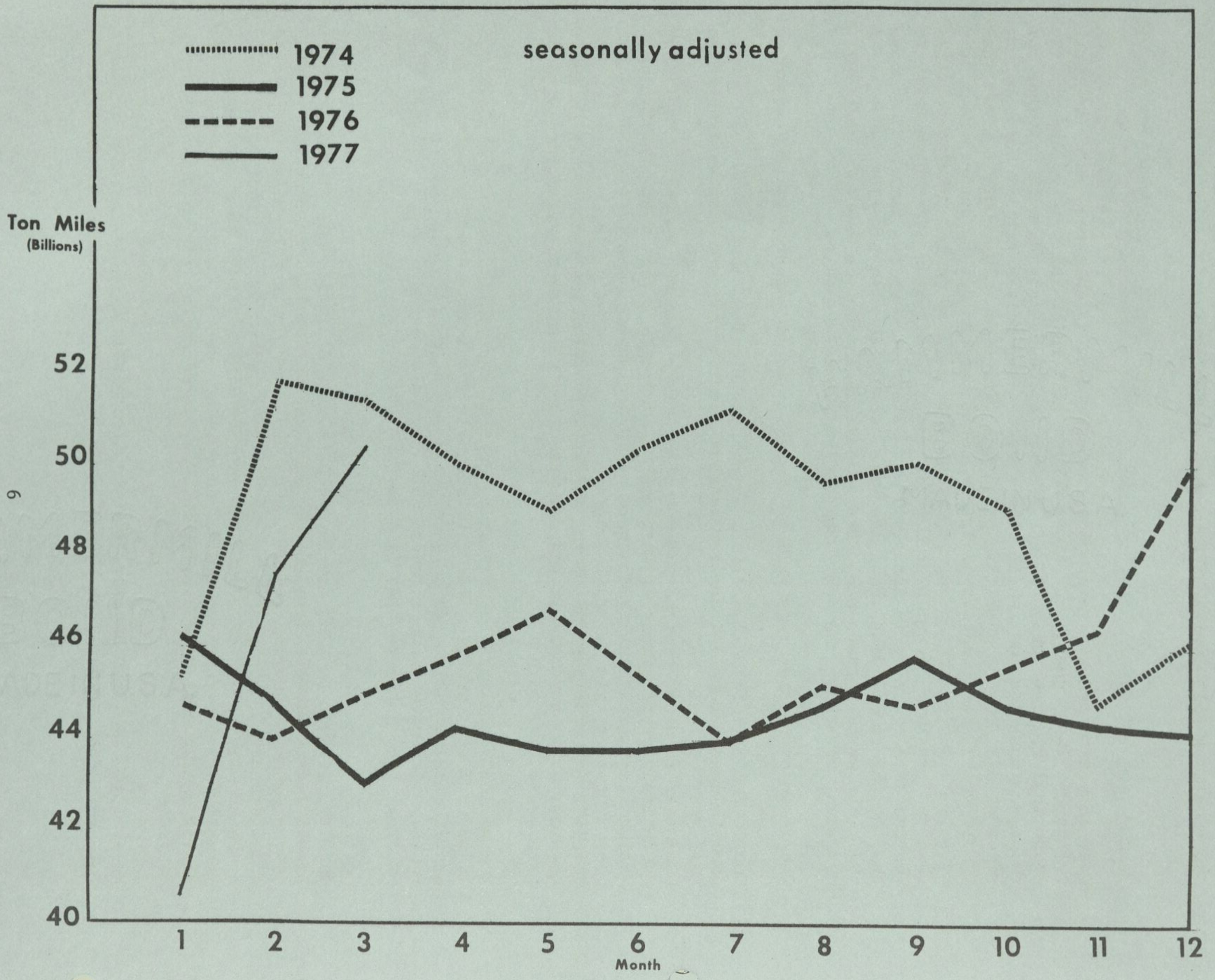
The nation's railroads experienced a profit squeeze in the second half of 1976, and if traffic is not adequate to absorb steadily rising costs, profit margins will again be under pressure after mid-year in the East and South. In our view, a modest rate increase on the order of 3% effective early in the fourth quarter is a possibility.

Railroads are different than most other cyclicals in the sense that soft physical volume tends to accelerate price (rate) increases. Therefore, we expect that a shortfall in traffic will not seriously undermine our revenue and earnings estimates. By the same token, should traffic modestly exceed our forecast, the prospects of further rate relief this year would diminish. The point of consideration is that rates tend to exert a normalizing impact on revenue and earnings trends, and traffic trends in coming months will be a key determinant of the timing of additional rate increases.

We strongly believe, however, that railroads will file for a rate increase late this year probably on the order of 5% or more, effective January 1978,

FIGURE 2

Ton Miles for Class 1 Railroads, 1974-1977



Goldman Sachs Seminar May 1977

to coincide with the new labor contract. At that point, little opposition is likely either from the ICC or individual railroads. Thus, the regional disparity in the impact of rate increases that was triggered by Southern Pacific a year ago will be neutralized after the September 1977 quarter, and the homogeneous pattern should continue in 1978.

Table 2

Rate of Year-to-Year Change in Freight
Rates and Ton Miles for Major Railroads, 1976-1978E

	1976					1977E					1978E
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Full Year	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Full Year	Full Year
Freight rates											
East and South	11%	11%	7%	5%	9%	9%	4%	4%	4%	5%	5%
West	11	6	2	5	6	9	9	9	4	8	5
Ton miles	1	8	5	4	5	2	8	6	6	5	5

The Railroad Revitalization and Regulatory Reform Act (Four R) provided that the ICC may not suspend rate increases or decreases up to 7% unless there is market dominance (which has not been finally defined) or the rate violates other sections of the Act dealing with discrimination and prejudice to either individual shipper or community. Subsequent to the enactment of Four R, the ICC proposed standards for market dominance. The railroads were in vigorous disagreement with these standards and petitioned the U.S. Court of Appeals for the District of Columbia to set aside the ICC's ruling. No decision has yet been rendered. However, when this issue is resolved, the railroads are likely to enjoy rate flexibility of some kind, a net plus for this industry. Nonetheless, measuring the potential impact at this point is virtually impossible, pending the final definition of market dominance. In general, the ICC has been very receptive to rate filings, and delays in winning new flexibility are not as onerous as they would have been in years past when the ICC moved slowly on rate filings.

Traffic

The rate of growth in ton miles as reported peaked at 8% in the second quarter of 1976 (also in Table 2). However, the fourth quarter was the strongest on a seasonally adjusted basis (see Figure 2). Seasonally adjusted traffic in the October-December 1976 period was about 3% higher than in the April-June interim. While catch-up of business lost from strikes in the coal and automobile industries in the third quarter accounted for some of the fourth quarter's relative strength, the conclusion that rail traffic was at its highest level for 1976 during the final quarter is not altered. And this fact is especially impressive in view of the significant liquidation of inventories that occurred late last year.

Severe weather conditions in January and early February of this year interrupted the favorable traffic trend of late 1976, and ton miles for the first quarter of 1977 rose by only 2%. But Figure 2 and Table 3 show that ton miles, seasonally adjusted, recovered in February and March to the late 1976 rate. We are forecasting that industrial production in the current quarter will be about 3% above the fourth quarter 1976 level and, accordingly, we expect that ton miles for the June quarter, seasonally adjusted, will be about 3%-4% above the October-December 1976 point and increase about 7% year to year -- that could very possibly represent 1977's strongest gains. We are somewhat concerned that if consumer spending softens in response to low savings rates and disappointment that the tax rebate was cancelled, some inventory cutbacks are possible.

Table 3

Ton Miles for Class 1 Railroads(a)
(seasonally adjusted, in billions)

Month	1974	1975	1976	1977
Jan	45.3	46.1	44.8	40.4
Feb	51.7	44.6	43.9	47.6
Mar	51.3	42.9	45.1	50.3
Apr	50.0	44.0	45.6	
May	48.9	43.7	46.7	
Jun	50.4	43.7	45.4	
Jul	51.2	43.8	43.9	
Aug	49.6	44.8	45.1	
Sept	49.8	45.9	44.6	
Oct	49.0	44.7	45.6	
Nov	45.0	44.4	46.5	
Dec	46.1	44.2	50.0	

(a) Railroad ton miles are reported on a weekly basis. Monthly data is not available. In order to seasonally adjust data, we used samples of three-week periods for each month. Thus, absolute data in this table will not agree with reported ton miles. Only the relationship between periods is valid.

Our traffic forecasts for the remainder of 1977 are related primarily to the estimates of industrial production derived by Goldman Sachs Economic Research Group. Our findings indicate that changes in rail traffic correlate closer with industrial production ($r = .8933$) than with fluctuations in other economic indices. Wide variances from the average for individual railroads usually reflect major changes in grain or coal tonnage, both of which have characteristics that substantially minimize their sensitivity to the level of business activity.

It should be pointed out that the first quarter's rather weak traffic results obscured several good performances by rails in areas where the

Goldman Sachs Seminar May 1977

severe winter weather was not a constraining factor. While rail carloads for the industry in the aggregate declined 2% in the March quarter, the following results were reported by individual rails that were not substantially impacted by the weather.

Railroad	Year-to-Year % Increase in First Quarter Rail Carloads
Atchison, Topeka, and Santa Fe (Santa Fe Industries)	8%
Union Pacific	7
Southern Pacific	4

Since freight rates in the March 1977 quarter were up about 9% from the year-ago period, revenue trends for those rails not seriously impacted by weather should be very good.

Traffic Mix

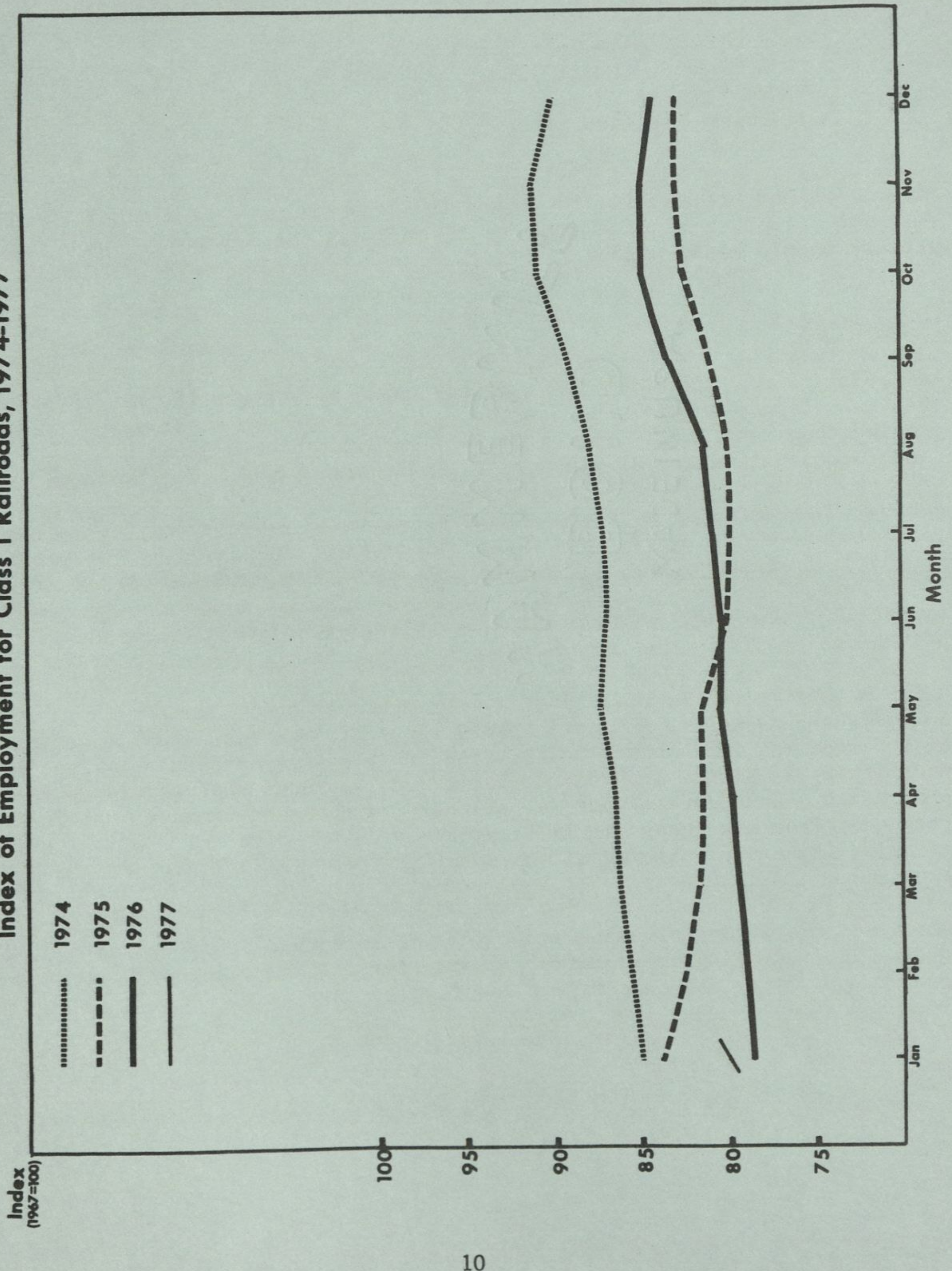
In addition to traffic (ton miles) and rates, traffic mix is a third critical element determining freight revenue trends. In periods of rapidly growing business activity, higher-rated manufactured goods account for a disproportionate share of the gains. Food, grain, and other important rail freight items tend to be lower-rated and not as sensitive to the economic cycle. Therefore, in a period of strong economic growth, freight revenues tend to rise at a more rapid rate than would be indicated by the compound effect of traffic and rate increases. In 1976, for example, industry ton miles rose 5% and rates climbed about 7%, but freight revenues increased by almost 15%; therefore, a favorable traffic mix accounted for about three-percentage points of the increment.

While higher-rated commodities will most probably enjoy another good year in 1977, the gains are not anticipated to be of the same magnitude as those experienced in 1976. Also, lower-rated grain movements should be up this year from a sluggish 1976 base-point and low-rated coal should be strong once again. Thus, we expect a slightly diminished impact on freight revenues from mix change in 1977, probably on the order of 1%-2%. Periods of major inventory building at the manufacturers' level could add to this premium.

We expect the effect of traffic mix in 1978 to more closely parallel 1977 than 1976. The highest-rated commodities, like automobiles, are not expected to enjoy the same magnitude of gains next year.

FIGURE 3

Index of Employment for Class 1 Railroads, 1974-1977



Goldman Sachs Seminar May 1977

Expenses

Atypically wide swings in employment levels, particularly for maintenance, have been a volatile element in railroad expense comparisons since the earnings debacle of early 1975. But headcount has stabilized, and inflation once again is the crucial factor in determining cost trends. The industry is currently in the last year of its existing three-year contract, and the inflation rate is more modest this year than at any time in recent years; this will be especially true in the second quarter.

The new contract to be negotiated for the 1978-1980 period is likely to be front-end loaded, and labor-cost inflation will undoubtedly accelerate next year. Moreover, pressures for higher materials prices should intensify further next year in response to the normal cyclical rebound in rail spending, and major incremental demand from government-funded Conrail will aggravate the process. Prospects indicate that fuel price inflation will approximate 10%. Labor, maintenance and fuel costs in the aggregate account for roughly 75% of rail expenses before income taxes. In sum, we expect total costs before income taxes to rise 9% in 1977 and about 10%-11% next year.

Labor

Year-to-year comparisons of employment levels have generally stabilized following the unusually volatile period that began in late 1974 (see Figure 3). Reflecting the severe slump in traffic in the final months of 1974, the railroads suffered a record loss in the first quarter of 1975; and the industry reacted with manning reductions unprecedented in its modern history. Employee headcount reductions at the peak in the late summer and early fall of 1975 were down as much as 9% year to year; that virtually neutralized labor-cost increases built into the current contract. However, as traffic and cash flow recovered, employees were recalled; by last summer, employment began to exceed year-earlier levels, and the increment peaked at more than 2% last fall. Subsequently, the gap has narrowed, and should close in coming months.

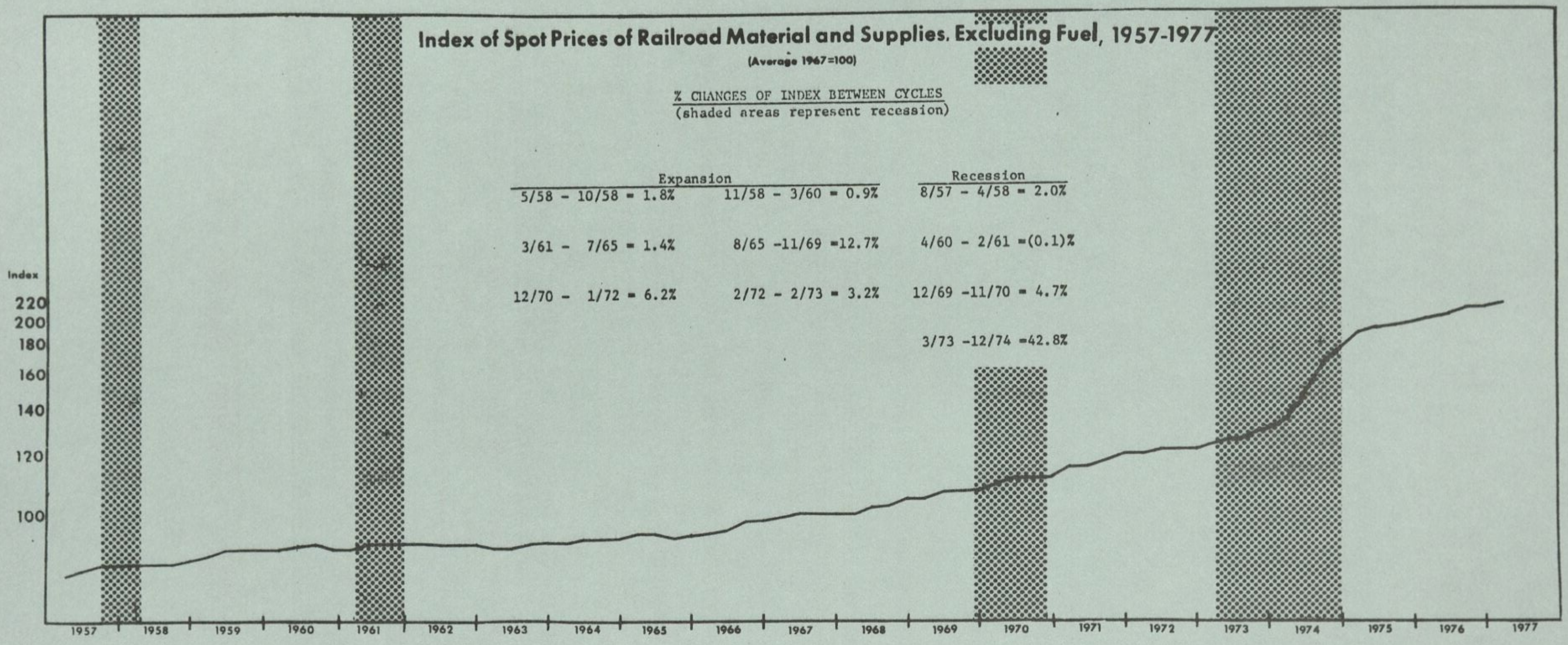
With employment levels stabilizing, labor expense comparisons have reverted to the more normal pattern in which changes in compensation levels (reflecting contractual provisions) are the principal determinant of changes in labor costs. (Table 4 shows the percentage increases in labor-costs for 1976 and quarterly increases for 1977.)

Table 4

Pattern of Wage Increases
Built into Current Labor Contract, 1976-1977

		1977				
	1976	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Full Year
Year-to-year % increase	10%	7%	4%	8%	8%	7%

FIGURE 4



Index of Spot Prices of Railroad Material and Supplies, Excluding Fuel, 1957-1977

(Average 1967=100)

% CHANGES OF INDEX BETWEEN CYCLES
(shaded areas represent recession)

Expansion		Recession
5/58 - 10/58 = 1.8%	11/58 - 3/60 = 0.9%	8/57 - 4/58 = 2.0%
3/61 - 7/65 = 1.4%	8/65 -11/69 =12.7%	4/60 - 2/61 =(0.1)%
12/70 - 1/72 = 6.2%	2/72 - 2/73 = 3.2%	12/69 -11/70 = 4.7%
		3/73 -12/74 =42.8%

Goldman Sach Seminar May 1977

The current three-year labor contract was front-end loaded, with the smallest year-to-year increases coming this year. And the increment in the June quarter is smaller than in any other interim of the contract. Thus, employee headcount and escalation in the labor contract will combine more favorably in the June quarter than at any time in the recent past or foreseeable future, although the pattern for the remainder of 1977 should be generally favorable.

The major rail unions have set the stage for the new contract to commence on January 1, 1978, requesting 15% annually plus fringe benefits over a three-year period. Typically, management's first offer is substantially lower than labor's request; and we would guesstimate a proposed increase of 4% annually, with provisions for significant work-rule changes. The final result is likely to be somewhere between management's offer and labor's request -- probably around 8%-9%. We would expect the new contract to be front-end loaded, and it is highly possible that the rate of increase in total compensation per rail employee will escalate in 1978, perhaps to the 9%-10% area from a rate of less than 7% in 1977. Employee headcount is likely to remain relatively stable; thus, labor-cost increases for the nation's railroads should closely parallel the inflation rate in wage scales in 1977 and 1978.

Materials and Fuel

Costs for maintenance materials (close to 18% of total expenses, with roughly two-thirds rolling stock-related and one-third roadway-related) rose about 6% last year, based on the Association of American Railroad (AAR) index of spot prices for railroad materials, excluding fuel. That was the smallest annual increase since 1973. However, the rate of inflation has been edging up (see Table 5).

Table 5

Comparative Percentage Changes in Fuel and Material Costs, Year-to-Year and Quarter-to-Quarter, 1975-1977

	1975				1976				1977
	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr
Fuel costs									
Year-to-year	64.0%	15.0%	8.0%	9.0%	11.0%	11.0%	10.0%	5.0%	4.0%
Qtr-to-qtr	1.5	(0.7)	2.2	5.9	3.6	(1.3)	1.0	1.8	2.4
Other materials costs(a)									
Year-to-year	40.0	31.0	18.0	11.0	6.0	6.0	7.0	7.0	7.0
Qtr-to-qtr	6.8	1.4	1.6	1.1	1.4	1.7	2.4	1.0	2.0

(a)Primarily maintenance.

Source: Association of American Railroads.

Figure 4 depicts the unprecedented increase in rail material prices coinciding with a similar phenomenon in the general economy during the 1973–1974 period. The Figure also shows that the escalation in materials prices moderated throughout 1975 and into early 1976, but never declined, although sharp cutbacks in maintenance programs occurred in 1975 in response to a record loss in the first quarter. A modest uptick in the inflation rate began after mid-1976. It is likely that rail material price increases will rise at an increasing rate as the cycle matures.

The feast-or-famine nature of most rail-supply businesses tends to limit the capacity of producers who have been reluctant to invest in major expansion and, when rising railroad cash flow stimulates maintenance programs and the limited capacity peak is reached, prices tend to accelerate. In general, the highs and lows in miles of track laid have coincided with highs and lows in earnings.

We expect (1) earnings of Class I railroads (railroads with operating revenues of more than $5 million annually), excluding Conrail, to rise approximately 10% pretax in 1977, and (2) the expansion in maintenance programs that began with the earnings recovery late in 1975 to be extended into 1977. Government funding for Conrail, which began during 1976 and is being increased this year, adds a significant new dimension to the demand side of the equation. Thus, we expect intensifying pressure on costs of rail materials.

Combining a modest increase (less than 5%) in the amount of maintenance work done this year with cost inflation of 8%-10% skewed toward the later part of the year, we expect maintenance material expenses in 1977 to exceed last year's level by more than 10%. However, the magnitude of the increase will vary widely among the individual railroads. Southern, for example, has accumulated large rail stockpiles and already has one of the industry's highest maintenance-of-way ratios. Therefore, this company is not under inordinate pressure to expand the amount of maintenance work on its property.

The AAR's index of spot fuel prices indicates that, on average, rails paid about 9% more for a unit of fuel in 1976 than in 1975. We anticipate that the unit cost of fuel will rise another 10% this year, but consumption should increase by less than 5%.

Earnings Summary

Rail earnings were erratic at best in the second half of 1976, and results in the first quarter of 1977 will vary considerably, depending to a great extent on each railroad's vulnerability to the severe winter weather. In some cases, significant tax adjustments — a product of 1976 legislation that permits railroads to apply investment tax credits against 100% of federal income taxes versus 50% previously — will result in the comparison of after-tax earnings being considerably better than pretax results. However, certain railroads realized the major benefits to reported earnings from this legislation in the second half of 1976.

Goldman Sach Seminar May 1977

In general, earnings of western railroads lagged the industry in the third quarter of 1976, reflecting the fact that these lines did not effect a rate increase, taken by the East and South in April 1976 until October. By the fourth quarter, all geographical areas were back on the same rate basis, and the erratic pretax earnings pattern was more widespread.

Second quarter 1977 earnings comparisons should be the most favorable and consistent since the second quarter of 1976, primarily for two reasons:

- The economy appears to be recovering nicely from last fall's sluggishness and from disruptions caused by cold and storms in January;
- The rise in employment levels (the number of employees in the second half of 1976 was up about 2% year-to-year) has stabilized and the year-to-year escalation rate of compensation in the existing labor contract will be smaller (about 4%) in the April-June 1977 period than in any other quarter during the existing contract.

The altered balance of rate increases this year versus 1976, when the East and South were favored, will allow the western roads about 4% more of a revenue increment in the second and third quarters than the rest of the country.

The freight rate imbalance will become especially critical in the third quarter, since traffic gains are not likely to match the second quarter's pace and compensation per employee will rise (year-to-year) at an 8% rate versus only 4% in the second quarter. Thus, third quarter earnings comparisons are likely to be mixed, particularly before tax benefits, although results in the West should remain strong.

Fourth quarter earnings comparisons will also be mixed, in our view, and the rate pattern will again be equalized. Unless another rate increase is effected in October or November or traffic is strong, the margin squeeze may be fairly broad in the fourth quarter. Nonrail operating earnings, which in general are more important among western and energy-related railroads, should improve virtually across-the-board. Union Pacific's prospects are especially favorable, primarily reflecting the expected benefits stemming from a three-year expansion of a Texas refinery completed late last year.

Finally, those railroads that have not earned enough profits in recent years to utilize investment tax credits will benefit from last year's tax legislation. In some cases, railroads began to apply unused carryfoward investment tax credits against deferred tax accruals in 1976, thereby reducing the incremental impact in 1977. The 100% flow-through applies in 1977 and 1978 and is subsequently reduced by ten percentage points annually, until the maximum reverts to the original 50% in 1983. For all of 1977, we expect that pretax income of western railroads will rise at about a 15% rate versus gains of 5%-10% in the East and South.

Table 6

Pertinent Comparative Data for Important Coal Hauling Railroads, 1971-1976

	Burlington Northern	Chessie Systems	Rio Grande	Missouri Paficic	Norfolk and Western	Seaboard Coastline	Southern Railway	Union Pacific
Total Transportation Revenues, millions								
1971	$1,029	$1,025	$109.5	$ 603	$ 785	$ 835	$ 647	$ 700
1972	1,098	1,025	112.7	643	851	1,077	724	779
1973	1,223	1,124	118.9	754	903	1,174	779	882
1974	1,432	1,321	140.8	890	1,053	1,357	909	1,000
1975	1,474	1,289	148.5	889	1,051	1,291	864	1,004
1976	1,739(a)	1,415	168.5	1,014	1,216	1,484	1,028	1,175
Compound growth 1971-1976	9.1%	5.6%	7.4%	9.1%	7.5%	10.0%	8.0%	9.0%
Coal Revenues, millions								
1971	$ 69	$338	$13.5	$14	$277	$159	$ 63	$22
1972	75	331	13.3	16	303	153	74	27
1973	91	349	17.1	16	307	156	70	36
1974	143	476	27.1	29	369	205	96	55
1975	211	501	36.3	39	426	235	103	81
1976	274	553(b)	43.5	52	465(b)	269	119	94
Compound growth 1971-1976	26.0%	8.5%	22.0%	24.0%	9.0%	9.2%	11.1%	27.0%
% Change in 1976 relative to								
1971	297.1%	63.6%	222.2%	271.4%	67.9%	69.2%	147.9%	327.3%
1972	265.3	67.1	227.2	225.0	53.5	75.8	116.4	248.1
1973	201.1	58.4	154.4	225.0	51.5	72.4	67.6	161.1
1974	91.6	16.2	60.5	79.3	26.0	31.2	24.0	70.9
1975	29.9	10.4	19.8	33.3	9.2	14.5	14.4	16.0
Coal Revenues as a % of Total Transportation Revenues								
1971	7%	33%	12%	2%	35%	19%	7%	3%
1972	7	32	12	2	36	14	8	4
1973	7	31	14	2	34	13	9	4
1974	10	36	19	3	35	15	11	6
1975	14	39	24	4	41	18	12	8
1976	16	39	26	5	38	18	12	8
Coal Tonnage, million tons								
1971	23	78	8.5	7	76	86	33	6
1972	25	79	8.7	11	80	81	37	8
1973	27	83	10.0	12	79	81	35	11
1974	32	81	11.2	15	82	88	37	13
1975	39	84	13.0	17	81	87	36	15
1976	43	87(c)	14.3	19	78	89	36	17
Compound growth 1971-1976	11.0%	1.8%	9.1%	18.1%	0.4%	0.6%	1.5%	19.0%
Revenue Per Ton								
1971	$3.00	$4.33	$1.59	$2.00	$3.64	$1.85	$1.85	$3.67
1972	3.00	4.19	1.53	1.46	3.79	1.89	1.90	3.38
1973	3.33	4.21	1.71	1.33	3.89	1.93	2.03	3.27
1974	4.41	5.88	2.42	1.93	4.50	2.33	2.59	4.23
1975	5.41	5.96	2.79	2.29	5.26	2.70	2.89	5.40
1976	6.37	6.35	3.04	2.74	5.96	3.02	3.31	5.53
Compound growth 1971-1976	13.4%	6.6%	11.4%	5.4%	8.5%	8.5%	10.1%	7.1%

(a)Includes truck and air freight forwarder revenues.
(b)Coal revenues include coke and iron ore revenues.
(c)Originated tonnage only.

Source: Moody's.

Inflation for labor and materials will accelerate next year, particularly since the new labor contract is likely to be front-loaded and rail-material suppliers will increasingly enjoy a sellers' market. Rail management is sure to file a rate increase to coincide with the new labor contract. But a combination of 5% growth in ton miles and 5% in rate increases would result in a period of uneven earnings comparisons in 1978. We expect rail earnings to rise 5%-10% in 1978 on an estimated 5.5% gain in real Gross National Product. U.S. corporate earnings should increase about 15% next year, according to preliminary estimates of the Goldman Sachs Economic Research Group.

Coal

President Carter is scheduled to address the nation on April 20 to outline his energy program, underlining the increasing role of coal. Table 6 shows pertinent historical data for several railroads where coal is a meaningful factor.

Leaks of the President's speech to date indicate little that would result in a major shift in the already perceived balance between development of eastern and western coal, although this may be altered before the proposals become law. Low-sulphur content and cheaper mining costs are the major advantages of western coal. But this coal is located long distances, often 1,000 miles or more, from major consuming areas and heat (BTU) content is roughly one-third lower than that of eastern coal. The long distances and substantially greater quantities to be mined and transported in order to generate equivalent amounts of energy result in transportation costs for western coal that may be a multiple of the mined cost of the coal. Thus, much of the mining cost advantage of western coal is neutralized when long distances are involved.

And, the low-sulphur content of western coal could become less of an advantage over the next several years if efficient techniques are developed to "clean up" eastern coal. Apparently, the President's speech will not provide for relaxation of environmental standards but will require use of scrubber equipment even in plants burning low-sulphur coal. Findings made public at a meeting of the American Chemical Society in March described a process that would permit 30%-40% of eastern coal to meet Environmental Protection Agency (EPA) standards at an estimated cost of $2.50-$3.50 per ton. We are not qualified to evaluate this or any other technique for desulphurizing coal, but intensive research is being focused on the effort.

There is considerable concern regarding eastern coal traffic this year, since the unpredictable United Mine Workers will hold national elections and negotiate a new labor contract in 1977. While this unquestionably is a volatile situation, there does appear to be at least one good argument for labor restraint. In particular, the Administration and Congress will be effecting major energy policy decisions -- including the mix of eastern versus western coal -- in 1977 that will influence the direction of coal development for many years, and poor labor productivity and recurring strikes in the East could meaningfully impact the East's share of future

Goldman Sachs Seminar May 1977

coal development. While we are most uneasy about prospects for labor peace in the coal mines this year, we believe this issue should exert some pressure for restraint.

Also with respect to coal, there is a high degree of probability that strip-mining legislation, similar to that vetoed by former President Ford, will be signed into law this year, perhaps as early as this summer. While this will lead to a renewal of leasing of federal coal lands, the law is likely to add significantly to the cost of coal development, particularly in the West.

Among the key issues to be resolved before strip-mining legislation is adopted is the definition of alluvial valleys, where strip-mining will be restricted. In addition, a determination must be made relative to those who own surface rights and mineral rights. It is our view that the balance of rights will shift in favor of the owner of surface rights. Finally, the issue of mountain-top mining (whether large flat areas that have resulted from mining operations must be restored to their original form or whether commercial or industrial uses can be developed) must be resolved.

San Antonio Rate Case

On March 29, 1977, the United States Court of Appeals for the Eighth Circuit denied a petition by Burlington Northern and other railroads to review a final order of the ICC that prescribed a maximum reasonable rate of $10.93 per ton for the movement of coal from Campbell County, Wyoming to San Antonio, Texas versus a rate of $14.67 per ton offered by the railroads when the movement began in October of 1976. In July 1973, in response to a request from the San Antonio City Public Service Board, the petitioners quoted a proposed rate of $7.90 per ton, subject to annual adjustments to reflect cost increases, to transport the coal in shipper-owned cars. The annual adjustment raised the proposed rate to $11.09 in May 1974, to $12.70 in July 1975, and to $14.76 in July 1976. San Antonio filed a complaint with the ICC in May 1975 regarding the rate adjustments; the circuit court held its hearings last December.

Since Burlington began carrying the coal at the $10.93-per-ton rate, the decision has no retroactive impact on earnings, but at the $14.76 rate, pretax income would have been about $8 million higher annually. Burlington's other unit coal train rates are escalated annually in July, but are excluded from general freight rate increases. However, in the case of the San Antonio movement, management imposed the 4% general freight rate increase implemented last January; consequently, San Antonio is now paying $11.37 per ton. Future general rate increases are also likely to be levied on this traffic.

The greatest risk arising from this decision relates to the possible reaction by other utilities relative to rates on unit train movements. The only other dispute that we are aware of to date is a protest by the Arizona Electric Power Cooperative against a rate filed for coal movements (scheduled to begin in late 1977 or early 1978) between Cameo, Colorado, and Cochise, Arizona by Denver and Rio Grande, Santa Fe, and Southern Pacific. However, other protests may be forthcoming.

While the court's decision must be construed as a negative, examination of the decision reveals substantial reservations on the part of the court with regard to several facets of the ICC's decision. And we believe that the major issues involved are by no means closed. The cost evidence submitted by the petitioners and San Antonio to support their respective rate levels differed significantly with regard to three variables: gross ton mile cost, locomotive capital cost, and plant capacity expansion.

The ICC used a 5.2% capital cost in computing ton mile cost and 8.5% for new locomotive capital costs, while Burlington used 14.8% and 15.5%, respectively. The ICC percentages represent the historical system average cost of borrowed capital for computing ton mile costs and recently sold equipment trust certificates for new locomotive capital costs. Burlington stated that its higher rates of return, ". . . were necessary to enable them to recover their cost of debt and equity capital . . ." The court upheld the ICC's computation on the basis that the commission had followed a long-standing practice, but noted that,

> Use of the 5.2% rate is open to serious challenge, particularly in light of recent interest rate levels and the large capital expenditures that will be required by railroads generally and for the movement of western coal in particular, but the petitioners have not made the kind of a record here that would permit us to face that challenge squarely. Indeed, they presented no evidence as to the historical cost of their borrowed capital.
>
> The exclusion of equity capital as an element of variable costs is also a long-standing Commission practice. It is another practice which is open to challenge. But again, this record is not one that permits us to resolve the issue.

We cite these passages to impart the flavor of the court's negative decision. Burlington Northern's managment no doubt senses the same message. It is probable that the decision will be appealed to the Supreme Court. It is also possible that the railroads involved will return to the ICC, particularly since the regulators had stated that the rate could be adjusted once the parties gained actual operating experience with this particular unit train movement, which is in its seventh month.

Investment Posture

We reiterate our investment posture that participation in securities of railroad-dominated companies be highly selective on the basis that reaching out on the risk spectrum is justified only in periods (like late 1975 and in the early portion of 1976) when confidence in strong earnings comparisons is high.

Goldman Sach Seminar May 1977

The increasing possibility that the economy may enter a period of less-exuberant real growth in the face of accelerating inflation places a premium on those businesses with the ability to pass through cost increases. And while railroads have been successful in convincing the ICC that timely rate increases are a necessity, only those combining superior unit volume growth and better-than-average profit margins will be able to sustain earnings momentum in the business environment foreseen beyond the near term. That is because the pressure on margins of the total industry tend to force rate increases, and the closer a carrier's rate of traffic growth and profit margins are to the industry averages, the more volatile its earnings.

Missouri Pacific, Southern Railway, and Union Pacific enjoy superior unit volume growth and profit margins that are above average for the railroad industry (see Table 7). And all three are significant participants in the transportation of coal, which will be further developed as an energy source (see Table 6). Because of the impressive earnings growth of these rails in recent years, their yields tend to be lower than those of more cyclical railroads, but prospects for dividend increases are superior. Comments on Missouri Pacific and Southern Railway follow. While Union Pacific's rail

Table 7

Comparative Statistics for Selected Railroads, 1970-1976

	Class I Railroads	Missouri Pacific	Southern Railway	Union Pacific
Revenue ton miles				
% Change				
1975 versus 1976	5.3%	6.7%	10.7%	8.8%
Compound annual rate				
1970 versus 1974	2.3	8.4	4.2	4.0
1970 versus 1976	0.6	3.7	2.0	3.0
1976 Data				
Maintenance of roadway ratio (a)	16.5%	13.8%	17.0%	14.1%
Transportation ratio (b)	39.6	38.5	31.7	34.7
Operating ratio (c)	80.5	73.7	72.5	75.4
Coal revenues				
As a % of total rail revenues, 1976	12.9%	5.2%	11.6%	8.1%
% increase, 1975-1976	12.0	35.6	15.3	16.2

(a)Maintenance of roadway expense to railroad operating revenues.
(b)Transportation costs (primarily train crew and fuel) to railroad operating revenues.
(c)Total railroad operating expenses to railroad operating revenues.

Goldman Sach Seminar May 1977

operations fit within the outlined framework, the stock is currently selling more on the basis of natural resource development; since this subject is not within the scope of this review, we have not commented on the company. The relative multiples of both stocks appear in Table 8.

Michael R. Armellino
(212) 676-7489

Candace Campbell
(212) 676-7700

Table 8

Price-Earnings Multiple of Missouri Pacific and Southern Railway Relative to the S&P 400, 1975-1977E

Missouri Pacific(a)

Quarter	1975(b)	1976(b)	1977E
1st	46.4%	55.6%	68.9%(b)
2nd	45.3	54.8	--
3rd	45.0	57.6	--
4th	45.5	60.3	--
Full year	45.6%	57.1%	66.6%(c)

Southern Railway

Quarter	1975(b)	1976(b)	1977E
1st	89.7%	74.1%	86.4%(b)
2nd	103.0	78.6	--
3rd	100.0	82.2	--
4th	81.0	91.4	--
Full year	93.4%	81.6%	90.2%(c)

(a) Based on fully diluted earnings, before purchase accounting adjustment.
(b) Based on close of quarter prices and trailing 12-month earnings.
(c) Based on closing prices April 17, 1977 and estimated 1977 earnings.

Goldman Sach Seminar May 1977
Background docs [illegible] traffic projections

Investment Research

Goldman Sachs

April 19, 1977

MISSOURI PACIFIC CORPORATION

Current Price	Earnings Per Share* 1975	Earnings Per Share* 1976	Earnings Per Share* 1977E	P/E Ratio 1976	P/E Ratio 1977	Indicated Dividend	Yield	1976-1977 Price Range
47	$4.17	$5.84	$6.75	8.0X	7.0X	$1.80	3.8%	48 - 23

*Fully diluted, before purchase accounting adjustments. Earnings are based on 14.8 million shares outstanding in 1977, and weighted average shares outstanding of 13.0 million in 1976 and 10.3 million in 1975.

Missouri Pacific Corporation, a holding company, owns 92% of the Missouri Pacific Railroad (MOP) and all of its two other subsidiaries, Mississippi River Transmission Corporation (MRTC) and River Cement Company. These subsidiaries contributed 80%, 20%, and 5%, respectively, to the parent's 1976 earnings before federal income taxes, minority interest, and extraordinary items. (Extraordinary items and the parent company's overhead and interest expense represent a reduction of income; that accounts for the 105% total.)

Until recently, interest in the equities of Missouri Pacific was relatively limited due to the confusion resulting from a battle between owners of two distinct classes of the railroad's stock. Such stock was created as a result of the reorganization proceedings that ended in 1955 when the railroad emerged from bankruptcy. Those who controlled operating management, "A" stockholders, were not motivated to substantially increase earnings, since residual earnings ultimately accrued to holders of the "B" stock. One way that operating management held down earnings was to invest heavily in maintaining physical plant. Missouri Pacific's (Mississippi River Corporation until 1976) management continued to accumulate "A" stock of Missouri Pacific Railroad and controlled 62% by 1973.

Confusion over the two classes of stock continued to overhang investor interest until 1973, when Missouri Pacific Corporation purchased the interests of the majority holder of "B" stock and one class of common

This material is for your private information, and we are not soliciting any action based upon it. Opinions expressed are our present opinions only. The material is based upon information which we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. We may from time to time have a long or short position in, and buy or sell, securities mentioned.

emerged. Since that time, the holding company has increased its ownership of Missouri Pacific Railroad to 92% and earnings of the holding company (fully diluted and before purchase accounting adjustments) declined from $4.60 in 1974 to $4.17 in 1975 and recovered to a record $5.84 last year.

While MOP's expense ratios do not compare as favorably with the industry averages as those of Southern Railway and Union Pacific, traffic growth trends are clearly superior (see Table 7); and we are convinced that this pattern can be sustained over the foreseeable future. This railroad serves a 12-state area in the Midwest, South, and Southwest, where economic growth is exceeding national averages. And while virtually all railroads boast of being service conscious, our survey of shippers has convinced us that this railroad's marketing capabilities are above average. In addition, MOP is strategically located to participate in the growth of western coal movement; coal ton miles should increase an estimated 30% in 1977 subsequent to last year's 36% gain.

The condition of MOP's physical plant has been subject to much controversy. While MOP's operating ratio (total rail operating expense as a percent of total rail operating revenues) compares well with that of Southern Railway and Union Pacific (see Table 7), the latter two railroads have achieved their operating ratios while spending a larger portion of their revenue dollar on roadway maintenance (maintenance-of-way ratio) than has MOP. At the same time, MOP's transportation ratio (primarily labor and fuel for train operations as a percent of rail operating revenues) clearly lagged. However, MOP's maintenance-of-way ratio was only fractionally lower than Union Pacific's and comparable to most other railroads that have a diverse traffic mix, except Southern, which has certain operating and geographical characteristics that demand higher levels of maintenance.

On balance, while it appears that MOP's physical plant may not be on a par with the very best in the industry, an analysis of available data shows that:

- MOP's locomotive fleet ranks among the industry's most modern;
- very few railroads have a higher percentage of heavy-weight rail on their main lines than MOP;
- an unusually high portion of MOP's system consists of branch lines, and traffic density is lower than for most other railroads, thereby reducing maintenance-of-way requirements somewhat.

However, we were not fully convinced of the efficiency of MOP's maintenance program on the basis of statistical analysis since variations in topographical, geographical, and other operating characteristics result in wide differences in maintenance requirements among railroads. It was the

Goldman Sach Seminar May 1977

Background data Seminar traffic projections

overwhelmingly favorable responses from shippers that persuaded us that MOP's physical plant is sound, since service capability is the ultimate test of the state of a railroad's physical plant.

We also believe that MOP's superior traffic trends, supplemented by the rate umbrella provided by rail industry aggregates, will provide the cash flow required to adjust any inadequacies. In 1976, for example, MOP accelerated its rail-laying program to about 500 miles per year from an annual average of approximately 300 miles in the preceding years. A large portion of the increment has been designated to upgrade the line between Kansas City, Kansas, and Pueblo, Colorado, a major unit coal hauling line. Earnings gains were strong in the face of this expansion last year and the rail-laying program this year and in 1978 will not change meaningfully from last year's accelerated annual level.

Mississippi River Transmission Corporation

Mississippi River Transmission Corporation (MRTC) is a natural gas pipeline company that sells gas to public utilities for resale and directly to industrial customers in Missouri, Illinois, and Arkansas. MRTC's deliveries of gas from traditional sources have been declining in recent years, but the company's exploration program has made it possible to raise the volume of gas sold to 226 billion cubic feet in 1976 from 218 billion cubic feet in 1975 and 217 billion cubic feet in 1974. New gas supplies produced by the exploration and development program have accounted for a rising portion of the total supply -- 19% in 1976, 17% in 1975, and 12% in 1974.

The pipeline accounted for $28.3 million or 20% of the parent's 1976 earnings before income taxes, minority interest, and extraordinary items. Generally, cold weather in January and February insures a very good first quarter. While weather will be an important factor in determining earnings for the remainder of 1977, a full year's benefit from rate increases put into effect during 1976 and an adjustment recently approved by the Federal Power Commission ($7 million annually) lead us to expect that pretax operating income for MRTC should reach $33 million this year.

River Cement Company

This subsidiary produces portland cement in a facility south of St. Louis on the Mississippi River. This business has been a consistent money maker, accounting for 5%-8% of pretax income in recent years -- too little to substantially impact our estimates for the parent. We would not be surprised to see this plant sold at some point.

Financial Data

During 1976, the holding company prepaid $18 million of term bank debt and purchased $22.7 million of bonded debt in the open market. Consolidated debt retirements totaled $76 million. The company continued to make significant purchases of its bonded debt in the open market during the early months of 1977. Annual maturities of long-term debt have increased from $36 million in 1976 to $41 million in 1977, and total $53 million, $43 million, $51 million, and $39 million in the years between 1978 and 1981, respectively. The holding company should generate about $180 million in cash internally this year, while cash requirements should approximate $225 million, primarily for capital expenditures, mandatory debt retirements, and dividends. Two equipment trust certificates totaling about $31 million have been sold this year and a third is imminent. Cash and equivalents were $132 million at yearend 1976.

In addition to roadway maintenance, a second questionable element in evaluating Missouri Pacific Corporation is the company's heavy debt load. At yearend 1976, the holding company's debt totaled $791 million (excluding current maturities) while stockholders' equity equaled $396 million, for a debt-to-equity ratio of 66 to 34. At yearend 1975, the debt-to-equity ratio was 80 to 20. While this leverage is unquestionably substantial, two points should be made.

First, the debt is mostly railroad related and carries relatively low interest rates. Missouri Pacific Railroad and Southern Railway generated railroad revenues of $1,013.6 million and $1,028.0 million, respectively, last year and outstanding debt at yearend was $793 million and $781 million. The former's interest expense totaled $46 million (railroad only), and the latter, $54 million. The Missouri Pacific Railroad earned $69 million in 1976 versus $89 million for the Southern, but MOP's net income has grown at a 43% compound annual rate since 1972 versus an 11% rate for Southern. MOP's base period distorts this comparison, but the gap between earnings levels has closed considerably. MOP will continue to show a higher growth rate at least in 1977.

The second important point in evaluating the holding company's debt burden is that a significant portion of the low-cost debt does not mature for many years. About $324 million of the total $895 million of debt outstanding at yearend 1976 matures between 2005 and 2045. Interest rates on these distant maturities range from 4.25% to 5%.

Purchase Accounting Adjustment

Purchase accounting rules were established primarily to correct accounting distortions resulting from purchases above book value. However, Missouri Pacific Corporation acquired the Missouri Pacific Railroad's stock below book. This reflects the artificially high railroad book values (according to the ICC's accounting rules, a major portion of a railroad's fixed plant is not depreciated). Therefore, the holding company's purchase accounting adjustments have been credits to income (see Table 1).

However, this situation will be reversed in 1977, and the net purchase accounting adjustment will have the effect of reducing fully diluted earnings per share from operations by an estimated 80¢. The reversal results primarily from a provision in the Tax Reform Act of 1976 that

Goldman Sach Seminar May 1977

permits railroads to utilize available investment tax credits to offset up to 100% of federal income tax liability in 1977 and 1978. On December 31, 1976, investment tax credit carryovers of $23 million were available to Missouri Pacific to apply in this manner. However, a major portion of this carryover was generated by the railroad prior to acquisition by the holding company, and Missouri Pacific Corporation's share of preacquisition carryovers, totaling about $19 million, will result in an equivalent cash flow benefit but will not be reflected as a reduction of tax expense for book purposes. This adjustment will be netted against other major purchase accounting revisions as follows:

- Depreciation expense will be reduced by about $20 million, reflecting the smaller asset base being written off (the acquisition cost was less than book value);
- Income from the purchase of debt at a discount will be reduced by an estimated $7 million, since the holding company's cost base for debt is calculated on the price at the time of acquisition, rather than at par; and
- The increased federal income tax expense from the above of about $5 million.

The end result of the above adjustments is a reduction of roughly 80¢ per share in reported fully diluted earnings. (Footnotes in Table 1 show the effect of the purchase accounting adjustment on fully diluted earnings for 1975, 1976, and estimated for 1977.)

Michael R. Armellino
(212) 676-7489

Investment Research

Goldman Sachs

April 19, 1977

SOUTHERN RAILWAY COMPANY

Current	Earnings Per Share*			P/E Ratio		Indicated		1976-1977
Price	1975	1976	1977E	1976	1977	Dividend	Yield	Price Range
57	$5.12	$5.85	$6.50	9.7X	8.8X	$2.32	4.1%	63 - 50

*Based on 14.6 million shares outstanding.

The lowest wage ratio among major railroads places Southern in the enviable position of posting superior operating margins (see Table 7) while spending a larger portion of its revenue dollar on roadway maintenance than other railroads (see Table 7). That insures a service capability long term and a flexibility to adjust expenses to revenue trends without undermining future operations. Southern's traffic has been growing at a faster rate than that of the rail industry (see Table 7). Exposure to Southeast's growth has been an important ingredient, providing the superior revenue flows that have enabled Southern to pursue its program of substituting capital for labor over many years. Managements of other roads with similar advantages have not been as aggressive in capitalizing on this opportunity.

Southern's tonnage and revenues from the carriage of coal have increased at a compound annual rate of 1.5% and 11.1%, respectively, since 1970. The more rapid escalation of the latter reflects rising freight rates and larger length of haul. Southern's coal tonnage is on the threshold of accelerating growth. Southern operated 11 coal unit trains at the end of 1976, plans to add two more by mid-1977, and at least six more by 1981. Coal was Southern's second largest generator of freight revenue in 1976, accounting for 12% of the total.

Southern's earnings have increased at a 10.4% compound annual rate since 1967; earnings declined in three of those years with the largest drop -- 12% -- occurring in 1975. During the past decade, U.S. corporate earnings have grown at a 7% compound annual rate and also receded in three years, with the largest decline -- 16% -- in 1970.

This material is for your private information, and we are not soliciting any action based upon it. Opinions expressed are our present opinions only. The material is based upon information which we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. We may from time to time have a long or short position in, and buy or sell, securities mentioned.

Goldman Sach Seminar May 1977
Background dope such as traffic projections

W. Graham Claytor, Jr., who served as Southern's senior executive since 1967, retired in February 1977 to become Secretary of the Navy. During his stewardship at Southern Railway, Mr. Claytor's principal function was to carry on a program, initiated by his predecessors, to maximize Southern's service capability by maintaining a superior physical plant.

L. Stanley Crane, Mr. Claytor's successor, is an engineer by training and rose through the ranks of Southern's operating department. Mr. Crane and Southern's other senior officers have been with Southern for many years and are steeped in the company's long-established philosophy of railroading.

Because Southern is so well-maintained (many in the industry must make up for past neglect of their physical plant with current inflated dollars), the company should be able to sustain a growth rate of about 10% over the long term, with the aid of superior traffic patterns and freight rates set by needs of the railroads collectively. We would only be concerned if Southern's superior traffic growth trends deteriorate. In that event, Southern's ability to continue its maintenance programs would be jeopardized, regardless of who is managing the company. Presently, this does not appear to be a meaningful risk.

Southern's balance sheet, with a debt-to-equity ratio of 43 to 57 at yearend 1976, is more highly leveraged than most asset-rich railroads (such as Santa Fe, Southern Pacific, and Union Pacific). This reflects Southern's aggressive program of substituting capital for labor and lack of opportunities enjoyed by the asset-rich railroads to capitalize on low-cost natural resource holdings.

Michael R. Armellino
(212) 676-7489

Goldman Sach Seminar May 1977

4/29/77

Upgrading

119# rail change incldg -
New rail & OTM - installed
35-40% new ties.
ballasting & surfacing inclg wk trns } $110 000/track mile
26 000/trk mile

119# rail change $136,000

136# rail change -
New rail & OTM installed
18-20% new ties
ballasting & surfacing inclg wk trains } 126 300/trk mile
15 300/trk mile

136# rail change $141,600/trk mile

Switches - $13 000 - $20000/switch

Does not include ditching, grading, bridges & culverts if needed

New Construction

Above the subgrade

119# CWR complete in place ties, ballast, & rail $215,350/mile

136# CWR complete in place $232,100/mile

No bridges, culverts, or grading included

Sig & communication based on actual

CTC (inclg switches sidings, signals, & communications) 1974 — 1976
Bond Hitchens - 72 miles @ $3.8MM = $52,800/mile

5/2/77

D&RGW - Track conditions

Main Track Miles - Trunck ⊽ 1020
of which we have 448 miles of 136#
CWR all weights - 325 mile or about 31% of main track

Our 77 program now calls for installation of 42 miles of new rail @ a cost of $6.05MM and 10 miles of secondary or relay @ a cost of $320,000
Total new & relay 52 miles - $6,370,000

Our 5 year program calls for

60 miles of new rail/yr
20 miles of secondary rail/yr

If we could maintain the pace and assuming most of this 136# in another 5 yrs we'd have 750 mile out of about 1020 main track mile or 73.5% of the mains

Track Capy - Train Frequency

Current - OWG
Front Range between Denver & Bond - 20 (incldg Moffats)
Bond - Grand Jct - 10
Pblo - JN - 8-10
} Dot - JN - 18-20
JN - RA 20
West of RA - SL 30

What is capy? of single track CTC
SP - handled 40-45/day
SF " up to 50
During UP strike several yrs ago we handled 45-50/day across 180 miles of desert

∴ we know its at least 50 -
I think it can be as high as 60-70 - ~~One [illegible]~~ a major constraint is time on the track for maintenance.

Goldman Sachs Seminar May 1977
Background docs [illegible] traffic projections

	1968	1970	1976
Tons Coal	7.6 = 32% of the tons	8.7 = 36% of tons	14.3 = 49% of tons
Tons Total	23.5	23.9	29.1
GTM Coal	1.1 = 15% of GTM	1.25 = 18% of tons	3.0 = 35% of GTM's
GTM Total	7.2	6.9	8.6
$ Coal	$11.5 = 12% of rev.	$13.2 = 14% of rev	$43.3 = 25.7%
$ Total	$94.1	$95.1	$168.5

76 Colo	76 Utah
x .03 x ✓	1.54 ✓ x
✓ 1.14 x	.74 ✓ x
✓ 3.07 x 0	x .01 ✓ x
x .01 x 0	x .06 ✓ x
x .5 x 0	✓ .93 ✓ x
x .97 x 0	✓ .34 ✓ x
x .88 x 0	✓ .14 ✓ x
✓ .26 x 0	✓ .71 ✓ x
✓ 1.18 ✓ 0	x .83 ✓ x
✓ .1 ✓ 0	x .19 ✓ x
✓ .16 ✓ 0	x .04 ✓ x
.25 ✓ 0	x .01 ✓
8.55	5.54

Goldman Sach Seminar May 1977
Background depositions traffic projections

4/26/77

Weekly Unit Trains - 4/26/77

USS = 20 + 2 = 22 ✓
CF&I = 5 = 5 ✓
~~F~~PSC = 6 = 6
UP&L = 6 = 6
AEP = 2 = 2
Ill Pwr = 3 = 3
Kaiser 3-4 3

33

47/wk = 6-7/day mostly some shorte fast.

Equip -

Coal svce locomotives
71 25 SD-45's 46 SD 40's

Cars
16M's = 984
19M's 395
Total 100 tonners 1379 100 tonners = 137,900 tons of one time carrying capy

14M's 378
17M's 867
1245 80 tonners 99,600 tons of one time carrying

237,500 tons

2624

①

Carters Speech – Coal

1 Production by 1985
+ 400 MM to 1B = up 65% over 600MM now

2 Conversion of Oil & Gas using utilities to coal
    a reinstallation – on ex coal burning
    b retrofit
    c New

3 Conversion of Industry
    a reinstallation
    b retrofit
    c new

Tell em what you're going to say
Tell em.
Tell em what you told em

Coal hauling

Proposition – Should the nation be able to produce and burn our coal reserves within reasonable environmental standards, will we have adequate transportation capacity to move it from the mine to the point of consumption?

②

accept for the moment Carters #

~~How much does this mean in railroad capacity~~

What does this mean in railroad capacity?

Ignoring for the moment the question of regional origin but considering the country as a whole, and assuming the entire output was to be moved by rail what kind of "burden" does this place on the railroad system as a whole (again ignoring the actual regional distribution of such traffic)?

2 ways of looking at it — Equipt Requirements
Line Capy

E. equipt requirements

I a 400MM tons/yr = 400 1 MM ton capy unit train systems

Using a 10000 ton capy unit as a std measure ~~and~~ we find that

~~Depending on tar for a particular system~~

a given system's capacity then depends on the tar = Ranges-

using 350 days as available shipping days.

Thus, 2 train sets on 7 day turns ~~constitute~~ will deliver 1MM tons/yr

On 3 day turns, ~~an~~ single set will dliver over 1MM

To be as conservative as possible, let's ~~use~~ use the 2 train set on 7 day turn figure or 2 100 car 4 unit sets/MM dlry capability

Then-to move Carters 400MM new tons-at the outside- we need 800 10000 ton train sets or 92000 cars & 3280 locomotives + spares

+1#12000 = 92000 car [illegible] 3680

At todays prices of 550M/unit & 30M/car = $

2B 24MM loco's & 2B 760MM cars. = T 4B800MM

(4B784 MM

550000
3200
110000000
1650000
1760000000

80000
30000
2400000000

Goldman Sach Seminar May 1977
Background deposits & traffic projections

2 Line copy

Again ~~looking~~ lets look at 400 MM tons in terms of 10 MM ton blocks

Each $\frac{10000000}{350 \text{ days to ship it}}$ = 28571 tons say 30000 tons/day/10 MM

Thus ~~only~~ 3 10M ton 100 car 4 unit trains/day to move 10MM/yr

Only 3 trains/day/10MM tons –

Since 40 10MM ton blocks = 400 MM annual & 3 trains/day/10 MM block, then 40 blocks of 10MM X 3 trains/day = 120 10,000 ton trains shipped per day

will handle entire targeted increase. 120 trains add'l per day – not on 1 line or 2 lines but ~~throughout~~ spread out ~~over~~ the net work.

240MM
who knows

So if the West got say 60% of the increase and it was all not realistic exported – we'd originate 72 add'l trains/day – again from several areas & using ~~the~~ several corridors

BN – CNW –
UP
D&RGW – BN
RI
MP
SFe
East

West
BN
SP
WP
UP
SFe

How about the network ~~copy~~ layout? Lets refer to a map ~~of the~~ showing the Rocky Mtn and Northern Great Plains coal fields and the main rail corridors leading therefrom to the rest of the country

(3A)

What about the west? How much? when?

at the AMC in T&U 2 days ago the FEA turned loose some # that said -

	1976		1980		1985
Total West	119.2	+ 206 vs 76 =	325.6	+ 509.7 vs 76 =	628.9 vs 76
Wyo abt $\frac{1}{3}$	39	+ 69 vs 76 =	108	+ 171 vs 76 =	210
Colo	8	+ 13.6 vs 76	21.6	+ 25 vs 76 =	33.2
Utah	8.5	+ 15.0 vs 76	23.5	+ 30 vs 76	39.2 8.5
FEA Total Colo Utah	16.5		45.1		72.4
D&RGW	14.0		34.2		72.3

Back to 3

Goldman Sach Seminar May 1977
Background depressing traffic projections

Map from appendix 3

From Deckers Mont - ~~BN~~

BN east via Alliance & Lincoln to midwest

BN northwest to Washington & ore

BN south to Texas & via connections at KC to Okla, ark LA & SW -

From Powder River Wyo

BN & ~~CNW~~ east

— CNW & Milwaukee backstop to Midwest

BN south to Tex & again via conns to mid south & south ~~west~~ east

BN northwest to Wash & Ore.

From UP - southern tier -

to east & midwest via Omaha & KC

to northwest

to SF via SP & WP.

to LA —

From Colo & Utah D&RGW Coal

to east & southeast & LA ark via BN, UP, RI MP & SFe

to ~~south~~ Texas - via BN & SFe & even RI & MOP

to Northwest via UP

to SF, & Central Calif & ~~northern~~ Nev via SP-WP

to LA & south Cal ~~& south~~ cal via UP -

From N Mex

via SFe both ways -

11^{15}-5^{37}

222 7^{45} A

1^{57} P

9^{00} via StL

4^{11}

Goldman Sach Seminar May 1977
Background dope & suckage traffic projections

⑤

General condition & capy of these corridors to handle say 72 dispatchments/day total

BN-already programed and hard at work on its alliance ~~and programmed~~ line and feeders. Knows what it has to do and is starting on the CES-FWD

UP- capy & condition already there with money to handle expansion as needed- ~~east~~, west northwest & southwest

SP- same

WP- same & looking for traffic-

Sfe- same as UP-

D&RGW- we just want the chance - continually implied concern over our capacity unwarranted - provided we can get the rates that provide the $ needed to ~~maintain~~ existing and expand capy as needed

RI & C&NW Milw corridors only weak links.

Now gentlemen = suppose ~~assuming~~ that there are capy problems - how do you correct?

Deferred maint? or prudent mgt on RI & Milw lines obvious exception

Depends on nature of problem - but remember - you've already got the basic ingredient - ROW

Probable sequence

existing branches - 85-100# rail up to 119# @ $136,000/mile cost at todays prices

lite main up to 136# = $141,600/mi

Get your ~~existing~~ trk up = then to get capy

1 signal- CTC 52,800/mile on non signalled ~~territory~~

2 double trk- new matl $232,100/mile + grading bridges & culverts

3 double trk CTC

Equipt & lead times for our 800 trains on our 400 systems.

92000 ~~80000~~ cars – in last 3 yrs RR since have ordered 48000 OT's or 16M/yr. Car bldrs have dlved 46M or 15400/yr. During last 3 yrs bldrs dlvd 191M cars all types or over 63000/yr. – Car bldg capy is available.

Present
Bldg 3/day
20 days/mo
12 mos. = 720/yr

Capy
6/day
20 days/mo
12 mos = 1440/yr

3680 ~~3200~~ loco's. – about 3 yrs of GM production flat out – present facility

Goldman Sach Seminar May 1977
Background docs [illegible] projections

& GAB phone 5/4/77

FEA ~~released~~ released
Westn States projections

76
80
85

	76 State Model 97 Nom	Fullout	80	85	Same tax Fullout
Colo	8.		21.6 MM	33.2	37.8
Utah	8.5		23.5 45.1 vs 34.2	39.2	64.5
Total West of which 1/3 wyo	119.2		325.6	628.9	813.5
of which wyo	39.7		108.5	200	

JET GAB

Incremental Production /day

	1980	1985
Colo	7.0	20.0
	7.4	12.6
	2.5	2.5
	4.2	9.7
	.8	3.0
	1.3	1.3
	23.2	49.1
Utah	2.4	8.1
	2.1	2.1
	3.0	7.0
	3.0 .5	5.0 1.0
	11.0	23.2

23.2 = 66285/day = 6&7 trains/day @ 10M = 14-east 7west = 21 train-

11.0 = 31428/day
3 trains/day @ 10.M
6 east 3 west = 9 trains

20 — 30 trains/day

34
15

34 MM
− 15
19 MM increase 1980
= 54286
10M/units/day
abt 6 more/day
or 12 east 6 west
or 18 more/day

18 trains =

12 x
4
48 east
24 west

What about the west? How much? When

The FEA turned loose projections at AMC

which said for	1976	1980	1985
Total West	119.2	325.6 + 206 vs 76	628.9 + 509.7 From 1976
yet Carter says			more 400 M 85
Of which Wyo abt $\frac{1}{3}$ say	39	108 + 69 vs 76	210 + 171
For Colo - FEA	8.0	21.6	33.2
D&RGW rough	8.5	23.2	49.1
For Utah - FEA	8.5	23.5	39.2
D&RGW rough	5.5	11.0	23.2
	16.5 vs 14.0 FEA RG	45.1 vs 34.2 FEA RG	72.4 72.3 FEA RG

Goldman Sach Seminar May 1977
Background dope-success traffic projections

⑦

What about D&RGW —

Our # based on projected mine activity - our territory

1977	15.5 MM ton	$51.7 MM
1980-81	30-34 MM tons	$142 MM
1985-90	72 MM tons	?

Rio Grande now runs 47-50 unit trains per wk to haul ~~most~~ of our present 14 1/2 - 15 MM. This is an average of 7 trains/day — some of which are short.

To move the addtl 15 MM tons in 1980 = addt'l 43000 tons/day. ~~In~~ std units of 10000/dispatch, thats at most - 5 additional loaded trains/day. ~~or~~ total of 10.

Because of the grades - over parts of our territory we will run 2 for 1 loaded - so at outside = 10 lded trains in 5000 ton sections + 5 empties or total 15 =

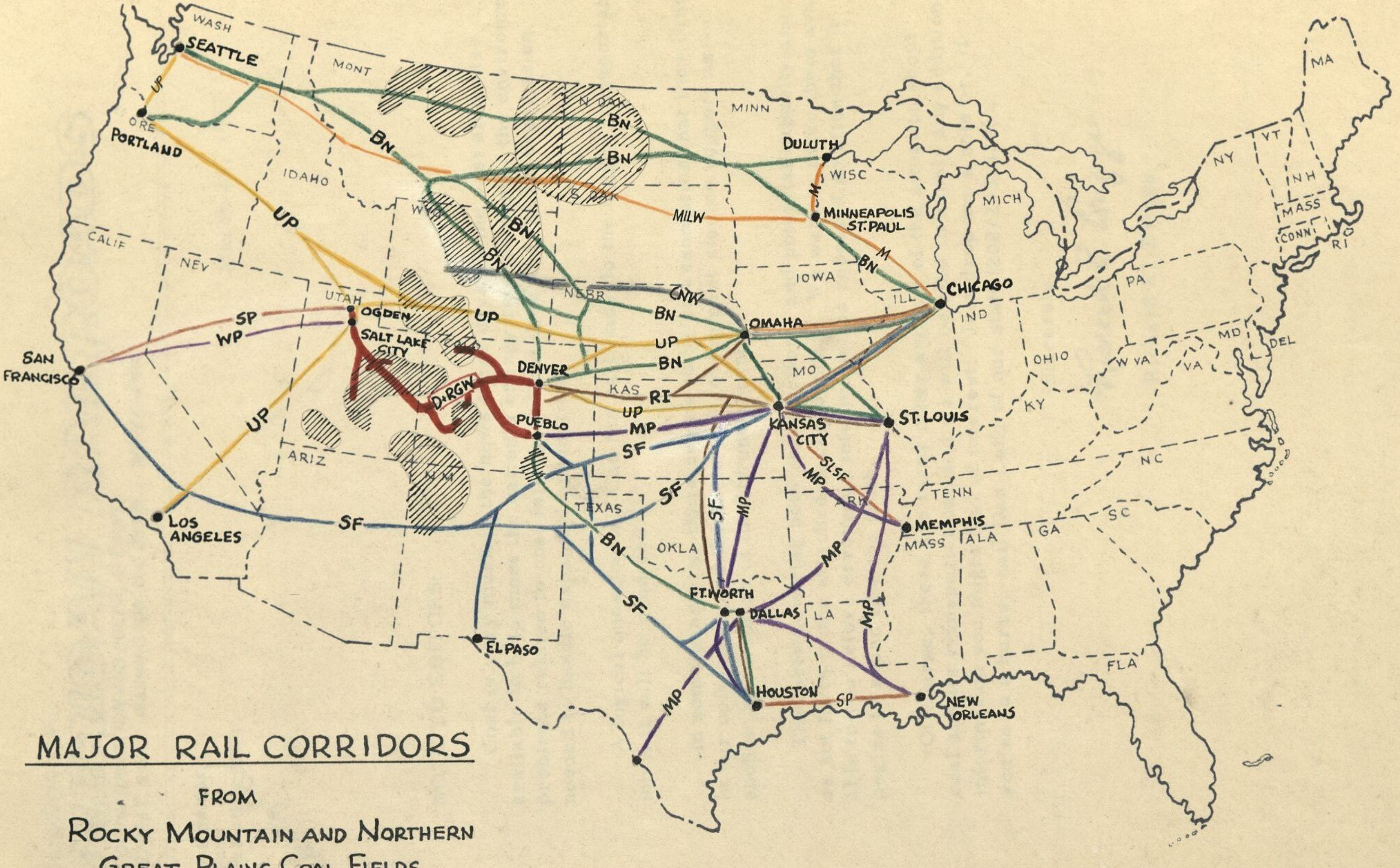
Really not likely to bust our backs capacity-wise

15

To handle our 15 MM then we might need 70 ~~100~~ more locomotives + say + ~~$~~1000 ~~more~~ RR owned cars + 1000-1500 private line or shippers & receiver owned

End it

Goldman Sach Seminar May 1977
Background dope such as traffic projections


WASH
SEATTLE
UP
ORE
PORTLAND
MONT
IDAHO
BN
N DAK
BN
BN
S DAK
MINN
DULUTH
WISC
M
MINNEAPOLIS
ST. PAUL
MILW
MICH
M
BN
CHICAGO
IOWA
ILL
WYO
BN
BN
UP
CALIF
NEV
UTAH
SP
WP
OGDEN
SALT LAKE CITY
UP
NEBR
CNW
BN
UP
BN
OMAHA
SAN FRANCISCO
DENVER
D+RGW
KAS
RI
UP
PUEBLO
MP
KANSAS CITY
MO
ST. LOUIS
SLSF
MP
UP
SF
ARIZ
N M
SF
LOS ANGELES
SF
TEXAS
SF
MP
ARK
MEMPHIS
MP
BN
OKLA
SF
FT. WORTH
DALLAS
LA
MP
EL PASO
MP
HOUSTON
SP
NEW ORLEANS
IND
OHIO
KY
TENN
MASS
ALA
GA
SC
NC
FLA
W VA
VA
MD
DEL
PA
NY
VT
NH
MASS
CONN
RI
MA

MAJOR RAIL CORRIDORS

FROM

ROCKY MOUNTAIN AND NORTHERN
GREAT PLAINS COAL FIELDS

—

Reaching Potential Consuming
Areas and Gateways

FOR PRESENTATION 5/5/77
GOLDMAN SACHS SEMINAR
by J.E. Timberlake, D+RGWRR

ASSOCIATION OF
AMERICAN RAILROADS
OFFICE OF INFORMATION AND PUBLIC AFFAIRS
1920 L STREET, N.W. · WASHINGTON, D.C. 20036 · 202/293-4160

RICHARD E. BRIGGS
Vice President
Economics and Public Affairs

J E Timberlake

March 24, 1977

NOTE TO EDITORS:

Coal is very much in the news these days -- the vast amounts available to help meet the nation's energy requirements, the environmental problems related to coal mining and coal use and the transportation needed to handle expanded production.

A logical question is: Can the railroads do the bigger transportation job that will be required?

In some quarters, there seems to be an assumption that they cannot. In our opinion -- and the facts and government studies support us -- such an assumption is totally unwarranted.

The facts covering both recent efforts and potential capacity are as set forth in the attached backgrounder. We want to make them available to you before erroneous information is repeated so often that it begins to sound like the truth.

Of course, there are many other aspects of the situation about coal and its transportation, and we will be glad to supply any additional information you might find of interest. Just drop me a note or, if you're in a hurry, call Dan Lang of our staff (202/293-4196).

Sincerely,

Richard E. Briggs

Richard E. Briggs

Goldman Sach Seminar May 1977
Background dope & studies traffic projections

Background on
TRANSPORTATION

ASSOCIATION OF
AMERICAN RAILROADS
OFFICE OF INFORMATION AND PUBLIC AFFAIRS
1920 L STREET, N.W. · WASHINGTON, D.C. 20036 · 202/293-4196

A Fact Sheet . . .

RAILS CAN HANDLE COAL PRODUCTION -- NOW AND IN THE FUTURE

Faced with a permanent shortage of petroleum energy, the United States is looking toward coal as a principal source of energy. Established reserves in this country are estimated to be sufficient for 400 years. Project Independence, undertaken during the oil embargo of 1973-74, called for a doubling of U.S. coal production by 1985.

Since the goal of doubling coal production was adopted, however, the likelihood of achieving that level has diminished rapidly. In the last three years, domestic coal production has increased 12.3 percent, and coal consumption has increased only 7.4 percent. A number of factors have contributed to this situation. These include environmental considerations, lagging growth in demand for electricity, plentiful supplies of imported oil and, some say, a lack of firm government policy leading to achievement of Project Independence goals.

One factor that has not contributed to lagging coal consumption or production, however, is the railroad industry's ability to move all the coal that is produced. Consider:

- In 1976, coal represented 19.5 percent of total railroad ton-miles -- making it the largest single commodity carried by the railroads. If coal traffic were to double over a ten-year period, while other traffic remained the same, the result would be only a 19.5 percent increase in rail ton-miles spread over ten years -- about 2 percent growth per year, on the average.

- Railroads -- and the government -- project a 50 percent increase in total rail ton-miles over ten years. All current rail plans take this into account. If coal traffic were to increase 100 percent instead of 50 percent, the result would be a variation of only about 10 percent in total rail traffic -- about 1 percent per year. By way of illustration, the railroads handled a 5 percent increase in traffic in 1972 and an unexpected 10 percent gain the next year for two all-time traffic records.

- During 1976, the average daily surplus for the entire year was more than 6,000 cars -- despite the fact that coal production had increased over the previous year.

- To maintain present capacity over the next ten years -- taking retirements and anticipated service improvements into account -- about 58,000 new coal cars are needed, or an average of about 5,800 per year.

- To handle a doubling of coal traffic, the railroads should acquire from 12,000 to 17,800 cars per year for the next ten years, including replacements and depending on the degree of unit train operations. It is anticipated that large volume production of new supplies of coal will be moved in unit trains, requiring fewer cars.

- In the last three years, new open top hopper orders have totaled about 48,000 -- an average of 16,000 per year. In the last three years, deliveries of new open top hopper cars totaled 46,231 -- an average of 15,410 per year. At the same time, coal production was increasing at less than half the rate calculated to produce a doubling in ten years. In the last three years, total freight car deliveries were more than 191,000 -- an average of more than 63,000 per year -- further establishing the availability of the necessary car-building capacity. One survey by the utility industry found that there is enough rail equipment building capacity to meet a sevenfold increase in railroad coal traffic over the next decade.

- Railroads expect that a substantial number of the needed new coal cars will be purchased by utilities. For railroads, this offers the two-fold advantages of reduced investment and commitment to rail service by the utilities. For the utilities, the practice offers a greater measure of control over equipment used for their benefit.

- Specific railroads are already gearing up to haul greater quantities of coal. The Burlington Northern has undertaken a $990 million program involving both additional equipment and improvements to the fixed plant. The Chessie System has embarked on a two-year, half-billion dollar program calling for the installation of 16,000 new 100-ton open top hopper cars. And the Missouri Pacific -- not, in the past, a big coal-carrying road -- has experienced a trebling of coal ton-miles since 1970 and expects the 1976 figure to double by 1980. So, the MoPac, too, has begun a substantial program of buying coal cars and upgrading lines. Other railroads are also making large investments to prepare for the growth in coal traffic.

- Elapsed time between the order of a new coal car and its delivery currently is about three to four months. The lead time for locomotive deliveries is about four to five months from the date the order is placed. And rail can be delivered in 90 days. All of these conditions reflect the ability of railroads to meet increased demand on any logically foreseeable timetable.

Goldman Sach Seminar May 1977
Background depositions traffic projections

- The time lag from decision to production for an electric generating plant is eight to ten years. A new mine takes four to five years to bring into production. Thus, it is extremely unlikely that a railroad could be caught unprepared to move coal.

- A problem of the railroads in recent years has been huge amounts of unused plant capacity. Now it may prove a blessing -- because this capacity was built at a cost far lower than would be possible today. This, of course, does not mean there will be no need for changes in the existing track structure or existing fleets. But these problems are clearly manageable. For example, the capacity of a line of single track can be greatly increased by centralized traffic control or by lengthening turnouts. Eventually turnouts can be connected to form double track.

- Coal represents a profitable commodity for the railroads. Assurance of expanded coal traffic carries with it assurance of access to financing of any needed additions and betterments.

- Four studies of the subject -- three of them performed by the government -- have reached conclusions indicating that the railroads would have no difficulty keeping pace with all anticipated coal production increases. For example, a Bureau of Mines information circular says "the capacity of the railroads to cope with substantially more western coal does not seem to be an unduly serious matter." A study for three government bodies by a prominent accounting firm produced figures which supported this assessment and a study conducted by the Department of Transportation concluded that anticipated coal traffic increases "would not place unmanageable strain on rail capacity."

#

Goldman Sach Seminar May 1977
Background dope [illegible] traffic projections

Goldman, Sachs & Co.
55 Broad Street | ~~New York~~ New York 10004
Tel: 212-676-7489

Michael R. Armellino
Vice President
Investment Research Department

ex 212-676-7700

Call Campbell?

Rec'd 4/26/77

Dinner 6

Window of the World
Top of World Trade Ctr
Mike Armellino

Call Bob Baldwin
GS
676-7747

GOLDMAN SACHS RESEARCH SEMINAR

Energy: A Focused Analysis of the President's Message

New York Hilton

Thursday, May 5, 1977

President Carter has now made his major policy address on Energy. The speech as expected covered a broad scope of energy and related topics, and the thrust of the policy directives were focused on conservation of energy and greater exploitation of this nation's coal reserves. Without question, the Energy Message is just the beginning of what promises to be a difficult struggle to overcome what the President has characterized as "the greatest challenge that our country will face during our lifetime."

To help each of us assess more intelligently the Energy Message, Goldman Sachs has asked a group of experts to share with us and you their considered reaction to the message. This will be done at the Goldman Sachs Seminar, Energy: A Focused Analysis of the President's Message. The seminar will be held at the New York Hilton on May 5, 1977. As the attached program indicates we will focus on Coal and Conservation but the Seminar is designed to reflect on the oil and gas industry, the question of Congressional reaction and the implications of the message for the economy and the stock market. We plan to structure the day to encourage as much give and take between speakers and guests as time will permit.

We urge you to spend this timely and informative day with us on May 5th. Program details are attached.

This material is for your private information, and we are not soliciting any action based upon it. Opinions expressed are our present opinions only. The material is based upon information which we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. We may from time to time have a long or short position in, and buy or sell, securities mentioned.

Goldman, Sachs & Co. Research Seminar

Energy: A Focused Analysis of the President's Message

Program

(All morning meetings will be held in the Trianon Ballroom)
New York Hilton Hotel 3rd Floor

8:30 a.m.	Coffee Service	Petit Trianon
8:50	Welcoming Remarks and Introduction	Lee Cooperman, Partner Goldman, Sachs & Co. Chairman of the Investment Policy Committee

9:05 The Oil Industry -- Has the outlook been altered materially by President Carter's Energy Message?
Mr. James Cozad, Vice President - Finance
Standard Oil Company, Indiana

9:35 Questions from our guests for Mr. Cozad

9:50 Coal Production and Coal Transportation -- A Detailed Analysis in the Light of President Carter's Energy Message.

17
4)70
4
30
28
2

1 10"
~~4020"~~
$17\frac{1}{2}$"

Mr. George Land, Director of Market Research
Amax Coal Company

Mr. Thomas Hamill, Vice President - Coal & Ore Traffic
Norfolk and Western Railway Co.

Mr. John Timberlake, Director of Unit Train Operations
Rio Grande Industries, Inc.

Mr. W. Pat Jennings, President
Slurry Transport Association

11:00 Questions from our guests for Messrs. Land, Hamill, Timberlake and Jennings

11:45-1:30	Lunch	Gramercy Suite

12:30
Luncheon Address
Mr. John Sawhill
President
New York University

Goldman Sach Seminar May 1977
Background dope sucks traffic projections

Goldman, Sachs & Co. Research Seminar

Energy: A Focused Analysis of the President's Message

Program

(All afternoon meetings will be held in the Trianon Ballroom)
New York Hilton Hotel 3rd Floor

1:45 p.m. Legislation and the Environmental Issues Affecting Coal Burning

Mr. Richard Grundy, Senior Energy Advisor to U.S. Senate Energy and Natural Resources Committee

Mr. William Harrison, Vice President
Southern Company Services, Inc.

Mr. John Tillinghast, Vice Chairman - Engineering and Construction, American Electric Power Service Corp.

2:30 Questions from our guests for Messrs. Grundy, Harrison and Tillinghast

3:00 Coffee Break

3:15 The President's Conservation Policy Directives and their implications for American Industry

A Senior Management Representative of
Owens Corning Fiberglas

Mr. William Walton, Vice Chairman of the Board
Holiday Inns, Inc.

3:45 Questions from our guests for Messrs. - - and Walton

4:15 Goldman Sachs' Analysis of the President's Energy Message

Roundtable discussion of the President's Message with focus on Specific Industries, the Economy and the Stock Market.

Roundtable Moderator	William J. Kealy, Director of Research
Roundtable Participants:	
Lee Cooperman, Partner	Chairman of the Investment Policy Committee
Gary Wenglowski	Director of Economic Research
Mike Armellino	Transportation
Wilbur Gay	Oil & Natural Gas
Dick Haydon	Automotive
Bob Higgins	Oil Service
Ernie Liu	Utilities
Morris Mark	Housing
Skip Nagelvoort	Machinery/Mining Equipment

5:15 Reception in the Gramercy Suite

Goldman Sach Seminar May 1977
Background docs Sections traffic projections

Goldman, Sachs & Co. | 55 Broad Street | New York, New York 10004
Tel: 212-676-7488
212-676-7700 Candie Campbell
William J. Kealy, C.F.A.
Director of Research
Investment Research Department

Goldman Sachs

Mr. John E. Timberlake,
Director of Unit Train Operations
Rio Grande Industries, Inc.
1515 Arapahoe Street
Denver, Colorado 80217

April 6, 1977

Dear Mr. Timberlake:

We are excited about the prospects for our seminar on the implications of the President's energy message, and are very pleased that you will be speaking. Enclosed is a copy of our initial memorandum on the seminar, indicating briefly the primary aspects of our program. We expect to finalize our list of speakers shortly.

Four distinct topics will be addressed during the day: the production and transportation of coal; the legislative and environmental implications of emphasizing coal production and use; the positive and negative impacts of the message on different industries; and, finally, the significance of the energy policy to the economy and the stock market. We expect that you will be speaking between 9:00 and 10:30 a.m., along with Messrs. W. Pat Jennings? and Thomas Hamill.

As the audience seldom has the opportunity to speak to such a variety of authorities, we believe this seminar will be of greatest value if we allot a good portion of the day to question-and-answer sessions. Your comments should be conclusion-oriented and would work most effectively in our program if limited to 10 or 12 minutes. You will obviously have additional time to develop your thoughts during the question-and-answer period. We welcome any exhibits or charts that you would like to use to document your positions; however, we must request that you forward them to us no later than April 26 so that they may be included in the seminar folder. Also, if you will need hotel accommodations, please contact us so we can make appropriate arrangements.

We are looking forward to the seminar and expect that you will make a valuable contribution to its success.

Sincerely,

Bill Kealy

William J. Kealy

Michael R. Armellino

New York | Boston | Chicago | Dallas | Los Angeles | Philadelphia | St. Louis | San Francisco | Detroit | Memphis

GOLDMAN SACHS RESEARCH SEMINAR

Energy: A Focused Analysis of the President's Message

As you know, President Carter plans to make a major policy address on Energy on April 20, 1977. The speech is expected to cover a broad scope of energy and related topics, but the thrust of the policy directives is expected to be on conservation of energy and greater exploitation of this nation's coal reserves. Without question, the Energy Message will have far-reaching implications. Investors are already attempting to anticipate the thrust of the speech, and clearly the issue is relevant to both investment policy makers and analysts concerned with the potentially affected industries and companies.

To help each of us assess more intelligently the Energy Message, Goldman Sachs has asked a group of experts to share with us and you their considered reaction to the message. This will be done at the Goldman Sachs Seminar, Energy: A Focused Analysis of the President's Message. The seminar will be held at the New York Hilton on May 5, 1977. We plan to focus on all aspects of coal -- production, transportation, legislation, and environmental issues -- and the positive and negative implications of conservation for industries and companies. Our speakers will also relate to other energy segments importantly affected by the President's message.

We hope you will block off the time for this full-day, in-depth review on May 5th. Specific program details will be mailed to you about three weeks prior to the seminar, but here are some highlights:

Coal Burning by Electric Utilities

All now agree that one thrust of the President's message will be to seek significant increases in the use of coal as a boiler fuel. One obvious problem in implementing the policy objective is the environmental restrictions with regard to sulphur emissions. Representatives of two of the nation's three largest coal-burning utilities will be at our seminar to discuss this critical problem. They are Dr. William Harrison, vice president (research) of Southern Company Services, Inc., who will speak on the solvent refining process as an alternative to scrubber technology, and John Tillinghast, vice chairman-engineering and construction of American Electric Power Service Corporation, who will address us on the economics of the pressurized fluidized-bed combustion method for emission control. Both of these distinguished gentlemen are leaders in the field of alternative technologies to meet the critical environmental issue of coal burning.

Goldman Sachs Seminar May 1977

Coal Hauling

Should the nation be able to produce and burn our coal reserves within reasonable environmental standards, will we have adequate transportation capacity to move it from the mine to the point of consumption? To address this issue, we are fortunate to have as speakers, Thomas C. Hamill, vice president-coal and ore traffic of the Norfolk and Western Railway Company, and John E. Timberlake, director of unit train operations for Rio Grande Industries.

Copy

What is west's expected share?
Translate to trains annually

Finance cars & loco

1 mile trk
1 mile signals
communications

How much for US to gear up?
rail signals

Legislation

Implementation of the President's policy directives will require the cooperation of Congress. To assess the current political realities of strip mining legislation and various proposals to require electric utilities to utilize alternatives to natural gas or petroleum as their primary energy source, we are pleased to have Richard Grumby, senior professional staff member, Senate Committee on Energy and Natural Resources.

Conservation

We plan to focus on the positive and negative implications of the President's conservation directives. A representative from Owens-Corning Fiberglas will speak on insulation, building codes, and the general topic of conservation in the home. We shall look at the implications for the automobile, transportation, utility, and oil and gas industries as well as the overall economy and share with you the results of specific in-house research projects we are now conducting.

Oil and Alternatives

Clearly the oil industry will be impacted by the President's message. Will sufficient incentives continue to exist to encourage replacement of depleting domestic oil reserves through increased exploration? How will the question of gas price deregulation be handled and what are the consequences? To what extent will alternative energy sources be encouraged in the President's message and how practical is it to assume they will meaningfully impact our future energy supply?

These and related developments will be addressed by several of the speakers on our program and brought into focus by several members of our Research Department, including our oil and oil services industry specialists.

Goldman Sachs Seminar May 1977
[illegible] traffic projections

Economics

How will the President's message affect the capital allocation decisions among industries? How will energy tax receipts be reallocated? What will be the long-run economic growth impact of the new Energy Program?

The Goldman Sachs Economic Group will analyze these and related economic policy questions and provide you with a framework for assessing the long-term economic implications of the Energy Program.

The Stock Market

Key to all of us is the eventual -- and longer lasting -- impact this upcoming Energy Message will have on the equity market and on individual groups. The Goldman Sachs Portfolio Strategy Group will share with you their assessment of the market's probable longer-run reaction, taking into account the analysis provided by our guest speakers and our own analysts, the thoughts of our Economic Research Group, and the results of their own in-depth analysis of the behavior of "energy impacted" industry groups.

The day will be a full and productive one. Further details will be shared with you when they have been finalized. We are enthusiastic about the seminar and certainly hope you will be able to join us.

Goldman Sachs Research

Retype

BIOGRAPHICAL SKETCH

J. E. TIMBERLAKE

John E. Timberlake is Director-Unit Train Operations of the Denver & Rio Grande Western Railroad. A native of Pittsburgh, Pennsylvania, Timberlake began his railroad career during college as a clerk in the purchasing department of the Pennsylvania Railroad. He graduated from Princeton University in 1951 with a degree in economics. Upon graduation he started with the Rio Grande as a Switchman at Pueblo, Colorado. During his first term of service with the Rio Grande, Timberlake worked as a Switchman, Engine Foreman, briefly as a Steam Locomotive Fireman on the narrow gauge, and as a Traveling Car Agent.

After two years in the Army Transportation Corps, he joined the New York Central in 1955 and served as an Assistant Industrial Engineer, Trainmaster, Transportation Engineer, Division Superintendent of the Chicago Junction and Chicago River & Indiana railroads, and finally as Superintendent of Yards and Terminals for the New York Central System. During the latter part of his service as Superintendent of Yards and Terminals, much of Timberlake's time was spent working with the Central's marketing and sales departments to develop the Central's first unit train operations.

In 1963, he left the Central to attend Harvard Business School from which he received his Master's degree in business administration in 1965. During this time Timberlake also served as a consultant for Arthur D. Little, Inc. in Cambridge, Massachusetts.

After graduation from Harvard, Timberlake returned to the Rio Grande as Market Director (Fuels and Minerals) and later as Market Director (Fuels). During this period he helped develop the Rio Grande's original unit train systems. He was appointed Division Superintendent of the Rio Grande's Colorado Division in February 1969. Timberlake became ~~was made~~ Director-Unit Train Operations in December 1970.

~~May 22,~~ 1973
April 21 1977

P. O. Box 5482
Denver, Colorado 80217

April 21, 1977

Ms. Candice Campbell
Goldman Sachs & Company
55 Broad Street
New York, New York 10004

Dear Ms. Campbell:

While waiting to receive my marching orders from President Carter last night, I was perusing the material you sent me and discovered a cryptic note reading "Biographical Sketch for Ms. Campbell", and so, forthwith, herewith.

I am looking forward to participating in your seminar. I'm sure that by the time your distinguished and highly talented audience finishes firing questions at me, my flak suit will sport a few new dents and rents in it.

Sincerely,

J. E. Timberlake
Director Unit Train Operations

Note source mat'ls used - but located elsewhere

1 Major acct analyses - by yrs incl'g GAB
supplement of 4/18/77

2 DOT Coal Capy study to 1980
done Sept 75

3 JET-GAB By mine analysis 4/29/77

4 AHEC summary projects & inquiries & money
for board 4/25/77

5 GAB 3/10/77 projection

Goldman Sach Seminar May 1977

Goldman Sachs

Date

To

From MIKE ARMELLINO

Jock,

So what's two-and-a half years late among friends! Note the name on top of the front page – an old friend of yours. See you soon. Meanwhile, don't hang anyone.

Mike

Miss Lynne Sherwood

Investment
Research

Goldman Sachs

Goldman Sachs Research Seminar

Energy: A Focused Analysis of the President's Message

Part II: Oil and Coal Production; Coal Transportation

This material is for your private information, and we are not soliciting any action based upon it. Opinions expressed are our present opinions only. The material is based upon information which we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. We may from time to time have a long or short position in, and buy or sell, securities mentioned.

Goldman Sach Seminar May 1977
Background depositions traffic projections
etc back to annual files

Investment Research

Goldman Sachs

ENERGY: A FOCUSED ANALYSIS OF THE PRESIDENT'S MESSAGE

On May 5, 1977, Goldman Sachs sponsored a full day Research Seminar entitled Energy: A Focused Analysis of the President's Message. The purpose of the seminar was to provide our investor clients with an intensive review of the President's energy proposals, both from the perspective of outside experts and from selected members of our own professional staff. A copy of the final program for that day's activities is attached.

Herein is the second part of the edited version of the transcript of the day's proceedings, covering the morning session on oil production and coal production and transportation. Part 1, covering comments by the professional staff of Goldman Sachs, is available upon request.

Welcoming Remarks and Introduction

Lee Cooperman, Partner,
Chairman of the Investment Policy Committee

On behalf of the firm and my associates, I welcome you here today to our seminar, which is designed to provide a focused analysis of the President's Energy Message. As you can see from the formal program for today's activities, we've planned a busy day for you. Our plan is to have both outside industry experts and our own analytical staff analyze and evaluate the major aspects of the President's Energy Message.

We will have reactions and analyses from the oil industry, coal mining and coal hauling industries, and a review of environmental problems regarding coal burning. There will also be a review of the opportunities available for conservation, an assessment of the effects of the program on future real economic growth and inflation, the program's effect on the stock market, and equally important, our industry specialists' reaction to its effect on certain key industries. We hope by day's end to determine

This material is for your private information, and we are not soliciting any action based upon it. Opinions expressed are our present opinions only. The material is based upon information which we consider reliable, but we do not represent that it is accurate or complete, and it should not be relied upon as such. We may from time to time have a long or short position in, and buy or sell, securities mentioned.

Goldman Sach Seminar May 1977
Background docs studies traffic projections
etc back to annual files

whether the program is soundly conceived, a monstrosity to use the words of Milton Friedman, a Malthusian approach as suggested by Bill Safire of the New York Times, or, more likely, some combination of all the above.

We'll leave a large part of the conclusion up to you. But, hopefully, you'll find that the day is informative and that it will help to focus on some of the important ingredients in the message.

Our first speaker is James Cozad, vice president of finance and financial officer of Standard Oil of Indiana as well as a director of that company. It is fitting that Mr. Cozad open up the program as a representative of an industry that approximates something on the order of 16% of the S&P 500. We in the investment business recognize that, for both the economy and for the stock market, it is important that this industry enjoy a fair, if not favorable, treatment in the proposed energy package.

The Oil Industry -- Has the Outlook Been Altered Materially by President Carter's Energy Message?

Mr. James Cozad, Vice President-
Finance, Standard Oil Company, Indiana

I appreciate you're inviting me to the seminar today, and ladies and gentlemen, I assure you that we welcome the opportunity to join with fellow representatives of energy-related companies to discuss the energy program that President Carter has laid before Congress and the nation.

Since the President made it clear that we are expected to sacrifice together, I think it appropriate that we should also talk together. And this is a splendid audience in which to participate. Perhaps it will prove helpful at the outset to review some of the fundamental energy supply questions that our nation must answer if it is to survive as a world power.

At present, the United States derives roughly three-fourths of its primary energy requirements from oil and natural gas. More than 40% of our oil, as you know, is being imported. By the close of this century, if my company's projections are in the ballpark, oil and natural gas will still supply about half of a substantially greater energy demand, and the difference will be made up by growth in nuclear power and coal.

Despite our best efforts to conserve, energy demands can still be expected to grow at an annual rate of about 2.7% over the next 23 years. And again despite our best efforts, exotic fuels such as solar, thermal, tidal, and the rest will supply precious little of our total demand. The President's energy message, as I am sure you know, was preceded with days, and indeed weeks, of foreboding rumors and press leaks that would do justice to a grade B disaster movie. The market dropped steadily -- 30 points in one week -- and we all were led to expect the worst.

What we heard on April 20 was almost a relief: A nickle-a-gallon tax on gasoline that may be imposed; higher taxes on gas-guzzling automobiles; industrial conversion from oil and gas to coal when it is practical; and some nice tax incentives to insulate our homes and offices. The entire thing could almost be characterized as the non-event of the energy crisis. And because of one small problem, the President's 90-day wonder isn't going to get the job done. Higher taxes will make energy more expensive but they won't add one drop to supply.

Frankly, America can no more conserve itself out of its energy dilemma than a pauper can save himself rich. Yet we have been living in an environment that not only sees dwindling supplies of readily available crude oil and natural gas at home but discourages efforts to pioneer new areas or to rework mature fields. At the same time, we have come to expect cheap energy. We've been conditioned to it and it's difficult to change. Indeed, it's this very kind of thinking that puts us in this mess in the first place.

And while we continue to consume high amounts of energy, seemingly awaiting an omniscient traffic cop to solve the problem, we must of necessity turn to foreign suppliers, and increasingly so. I remind us of these things not to spread gloom but to sharpen our perspective as we consider the potential impact of President Carter's energy proposal. Agreed that it was vitally important that the President laid it on the line that America's energy situation is bad. It is imperative that the public become a believer that there is an energy problem, and now they've got the word from the highest authority in the land, complete with a reminder that sacrifice is in order. But whose sacrifice? That's where the President and I part company.

Because I feel that his complex plan only nibbles away at the problem, while at the same time, it hobbles the petroleum industry and has a spillover effect on all business and industry. There is a missing ingredient in his plan. What is so obviously overlooked is that, if producers are going to seek out and produce more domestic supplies -- supplies that are increasingly harder to get at -- then the prices they receive for their products must reflect the replacement cost of these products. In other words, the law of supply and demand must be allowed to operate as it ultimately will be forced to do so. It's this law, not a federal law, that will serve to whittle down consumption and increase supply, and most importantly, that is what it will take to generate the additional investment dollars that are needed to bring in new quantities of crude oil and natural gas and other vital petroleum products.

In his energy message, the President recognized that energy should be priced at its true replacement cost. Yet his program proposes to achieve these levels through the medium of taxation, and unfortunately, these higher taxes will not contribute additional energy to our domestic supplies. Indeed, as we see it, Mr. Carter's program would result in even less revenue being available to domestic producers than under existing regulations.

This is hardly the way to offset our nation's gradual decline in production of both oil and natural gas. As most of you are aware, domestic production of both oil and gas peaked in 1970-1971. It has been slowly but steadily falling ever since. This is the natural and predictable result of a sharp decline in exploration and drilling dating back to 1956. It is true that drilling trends have turned upward in the last two or three years in response to higher prices that have been available. More rigs are currently at work in the United States than has been the case for the last 10-12 years. But because of the lead time involved in this business, this more aggressive drilling program has not yet arrested the decline in production from older fields discovered many years ago.

Complicating the problem is the continued escalation of exploration and production costs. These have been rising at rates three to four times the level of general inflation. But this fact is not recognized outside our industry. There is the further fact that much of our exploration and drilling is being carried out in more remote and more hostile environments. America's easy oil has long since been found. We are having to look now at more complex geological features and in more expensive places like the offshore areas and the frontier area locations in Alaska. It is obviously more expensive to move men and equipment to places like these than it is to travel across the plains of Oklahoma or Texas.

And there is the matter of deeper drilling. It is technologically possible to drill to depths of 25,000-30,000 feet, but it is costly. In the production business, drilling a hole twice as deep doesn't cost twice as much, it's more like a multiple of four or five. A typical cost of drilling for oil or gas in the United States rose by 129% over a recent ten-year period. That's on the average. If you're exploring in some remote parts of the Northern Rockies, as my company is, you're learning that a 10,000-foot well costs three-and-one-half times more than it did ten years ago.

These facts all underscore the point that we will need tremendous amounts of new capital, not only to keep pace but to begin gaining on the energy supply problem. Obviously, we're not going to do anyone any good by discouraging efforts to find and develop new supplies. To encourage a maximum effort we need to assure producers of adequate revenues to pay these increased costs plus a reasonable profit. Imposing new excise taxes on crude oil certainly does not square with that objective.

On the basis of the President's program, we would estimate that the new proposed taxes would amount to $60 billion a year in 1985. As impressive as that figure sounds, however, we believe the net effect would be a saving of only 1 million barrels a day of consumption as compared with what it would be under the continuance of current regulations. We think that that is a modest saving, indeed, as compared with the 36 million barrels of oil-equivalent energy that this nation consumes daily. It will certainly do little to mitigate the need for an increasing flow of imports of foreign oil into the United States. On the other hand, if all or part of that $60 billion a year could be channeled into further exploration and development, the impact could be significant.

Goldman Sach Seminar May 1977
Background dope such as traffic projections

I mentioned that the number of drilling rigs in the United States now stands at the highest level in the last 10-12 years. Further tangible evidence of the encouraging effort that adequate revenues can have is the industry's experience with natural gas in the producing states.

Several years ago, there were impending shortages of natural gas in Texas and Louisiana. Recognizing this, gas purchasers in the unregulated intrastate market began offering more money for natural gas. As a result, exploration and drilling expanded. Some areas that were uneconomic at lower prices were developed. And today, there are adequate prices of natural gas in those states. At the same time, some industrial users who were originally attracted to natural gas by its low price in relation to other fuels have begun to switch over to other fuels, thus achieving the same kind of conservation that Mr. Carter hopes to encourage through his tax program.

Now, we are convinced that there is much more oil and natural gas yet to be discovered in the United States, but no one knows precisely where it will be found and how much there will be. Much of it will be found offshore, much of it in frontier areas, and much of it will be found through deeper drilling in the more mature producing provinces onshore. And, as I have indicated, the cost will be great.

There is also much oil and gas in fields that have already been discovered that will not be recovered by ordinary methods. As I am sure you are aware, oil does not exist in pools or lakes underground, simply waiting to be siphoned off like you would drink Coca-Cola from a straw. Instead, it is dispersed throughout the porous spaces of buried rock formations with roughly the consistency of a concrete sidewalk. It takes energy, either natural or supplementary, to move that oil through the rocks and into the well bores of the producing wells.

Currently, water flooding is the most popular and most widely used mechanism to provide that supplementary energy. In that process, water is injected into the producing horizon to force oil to the well bores. In some fields, water flooding is extremely effective; in others, it leaves behind a substantial amount of oil that must be recovered by other means. These techniques fall generally into the category of enhanced recovery. One process that shows promise involves the injection of carbon dioxide into the reservoir to serve as a scrubbing agent. Others involve the injection of chemical compounds that act much like solvents to glean the oil from the surfaces of the rock pores. Obviously, these projects will also be expensive. But considerable research still needs to be done to perfect the processes so the oil can be released to help supply our energy needs.

Our company, for example, has seven pilot projects in operation right now to determine whether laboratory-developed techniques will work just as well in the field. We are optimistic that they will. We believe that these processes could recover as much as 1 billion additional barrels of oil in West Texas fields alone that are under lease to us. But the money to pay the costs involved must come from somewhere. It will not come from the

$5.20 price currently being allowed for so-called lower-tier or "old" oil. It is true that Mr. Carter's program proposes to allow world prices for new oil discovered in offshore federal leases acquired after April 20, 1977, or from wells drilled two-and-one-half miles from existing production or 1,000 feet deeper than established production.

In the case of the federal offshore leases, however, these revenues could not begin to have any substantial impact on industry revenues for at least five years, and then only after considerable private front-end investment.

With respect to the two-and-a-half-mile and 1,000-foot limitations, Senator Harrison Schmitt of New Mexico, himself a geologist, said at a Senate hearing this week that these definitions of new oil are "ludicrous" because they are irrelevant in geological terms.

The President's program also proposes to allow the price of new interstate natural gas to rise from its current FTC-approved level of $1.45 per thousand cubic feet to $1.75. At the same time, however, he proposes to extend federal controls to the unregulated intrastate market, thereby effecting a price rollback on gas consumed within the states of production.

The 23-year failure of federal price controls on interstate natural gas should be obvious to anyone who thinks about the situation. Indeed, there are those who believe that this federal policy is substantially responsible for our current energy problem. By holding prices far below those of competing fuels, the regulators have artificially stimulated demand for this premium fuel, while at the same time, diminishing revenues to those who would otherwise seek out and develop new supplies. Is it any wonder that demand has outstripped supply? Is it any wonder that our natural gas reserves have declined steadily over the years? I think not.

Thus, the President's program pays lip service to the question of providing incentives to new supply. In reality, it has a negative impact, notwithstanding Mr. Schlesinger's stout defense of the program.

Considerable concern has been voiced about the impact of rising energy prices on both the economy and on the incomes of the disadvantaged. However, in the case of natural gas, where the FTC's top price is currently $1.45, the price applies only to gas discovered and committed to the interstate markets in 1975 and 1976. Thus, the average price of gas being sold today is less than half of this, partly because of FTC controls and partly because of contractual agreements entered into many years ago. In our own case, 67% of our gas is currently being sold at a price of 29.5¢ per thousand cubic feet -- which, incidentally, is one-eighth the price of imported crude on an equivalent-BTU basis.

It must be further remembered that most of the cost of gas to the ultimate consumer is comprised of transportation and distribution costs. So a gradual rise in the wellhead price would not have that severe an impact on consumers. A completely free marketplace for oil and gas would obviously

Goldman Sach Seminar May 1977
Background dope success traffic projections
etc back to annual file

be the ideal solution to our energy problem, but that, no doubt, is politically unpalatable.

As an alternative, we would favor a gradual phasing out of controls on oil and natural gas prices so that prices would reach world levels over a five-year period. This program would soften the impact on the economy but would give a true stimulus to efforts to find and develop new supplies.

Since the President's program seems solidly committed to continuing controls indefinitely, then there should be some mechanism for passing through to producers the revenues to be derived from the excise taxes on crude oil to the extent that producers reinvest funds in the search for new oil and gas here at home. I am not prepared to offer details of that mechanism to you today, but I would remind you that the President's program also does not provide details of how his tax proposals would be rebated to consumers.

One further thought with reference to higher revenues to producers: I have not mentioned the alternative sources of energy that are available to this country and in Canada. The oil shales in Colorado, Wyoming, and Utah are estimated to contain more oil in reserve than all of the conventional oil in the Middle East. The tar sands of Canada also contain vast reserves of hydrocarbons. We might say we don't feel we have an energy shortage -- we think we have a temporary economic problem. These reserves can be developed, and one day I am convinced they will be making a substantial contribution to our energy supplies. But, again, they will be expensive processes, and they simply cannot be undertaken if revenues are not adequate to offset costs and return a profit commensurate with the risks involved. In short, we have plenty of energy sources available to us here in the United States if we are willing to pay the price.

What all of us Americans must realize is that the era of cheap energy is over. We must face up to the fact that energy, like everything else in our economy, and indeed in the world, simply costs more today than it did 10, 20, or 30 years ago.

Ultimately, the U.S. economy will be forced to accommodate itself to whatever market-clearing prices are required to insure increasing supplies of home-grown energy. It will be expensive; it will be accompanied by some minor cuts and bruises within the economy. I remind myself, though, that one of the great strengths of this nation is its resiliency; its stubborness and resolve in the face of a critical situation. Market forces will provide the incentive to develop alternative energy sources as our conventional ones become increasingly expensive. The economy will find it well within itself to adjust to the prices needed to encourage full-scale development.

In the final analysis, this approach will be the least costly one and the most productive.

Goldman Sachs Seminar May 1977
Background depressing traffic projections
etc back to annual files

Question: Would you comment on the price of substitutes? What price would be necessary to produce oil from shale and tar sands, and greater volumes of natural gas?

Mr. Cozad: I can give you some ballpark figures. My own company is a half-owner in the first shale lease out in Colorado. As I recall, we paid $217 million for the lease. That was about, I believe, three years ago. We've spent considerable millions of dollars trying to find out the answer to your question. We think that with what we know today and using today's costs, it would be somewhere in the $18- to $20-per-barrel range.

A 50,000-barrel-a-day synthetic shale refinery costs somewhere in the area of $1 billion. Technologically, we think that we can handle this. But that's sort of the ballpark figure that we would be looking at today. I'm not an expert in coal gasification or liquefaction, but it's my understanding that now they're looking at $25-$30 a barrel for that, with tar sand somewhere in between those two.

Question: Does Standard Oil of Indiana have any studies on the elasticity of gasoline demand, specifically, at what price per gallon would there by a significant falloff in demand?

Mr. Cozad: I think that the gist of President Carter's tax proposal on his 5¢-a-gallon increment, should the consumption not meet the requirements, in our opinion, would have a very minor effect. We would think that, over time, one of our big problems with his program is that he projects that, by 1985, the overall usage of energy in this country would go from its current 36 million barrels a day to something like 48 million barrels a day; and we wouldn't be too far off from that figure ourselves.

We do not believe that the tax increases would have the dampening effect on consumption that the Administration does, so where he backs into a 6-million barrel-a-day import figure in 1985, our estimate would be that the figure would go up to somewhere in the area of 10-11 million barrels a day.

I might say that adding these taxes on crude, and assuming a 6%- to 7%-a-year inflation factor, gasoline, as I recall, goes up to around $1.50 per gallon in 1985, and I think in 1990 it would be close to $2.00. And we don't believe that it will have anywhere near the effect on consumption that he does.

Question: You mentioned that the price of oil must reflect its replacement cost, but that Mr. Carter's program does not achieve that. Is it not true that the President's program allows newly discovered oil to be priced at current world market prices without taxes and is not that a sufficient incentive to discover new oil, and is it not true that world market prices for oil today are greater than replacement costs?

Mr. Cozad: We really don't know what replacement costs are. As you are aware, the SEC has asked the extractive industries to be prepared to discuss that in their 1977 reports. There is a tremendous amount of work being done on it. As I would view it, yes, world market price appears to be an incentive today.

However, as you know, it does not apply to leases that we now have as of April 20. Therefore, it can only apply to new leases, should we receive any new leases some time down the road. The new Secretary of the Interior has cancelled any further lease sales until he has had an opportunity to review all of the impacts.

In the sale of the Baltimore Canyon last year, I believe we paid something on the order of $1 billion for one of the leases. And a federal judge said that the government probably grossly overestimated the amount of crude that was available out there and, therefore, maybe all the transportation problems envisioned wouldn't exist. We really don't know how this judge arrived at what is in the Baltimore Canyon. So, when you say today that the world oil price would be a good economic incentive on a replacement-cost basis, I don't know if that is accurate. If you want to make the assumption that we get some leases in the next year or two and that its another five years until we would have any production, and if you also want to make the assumption that all of the costs of exploration and development are not going to continue to accelerate, it might very well work out.

But I think it's fair to say that when you bring on normal new discoveries today at the world oil price, the economics are pretty good. But the fact of it is, that doesn't apply to much of anything today.

Question: In light of the two-tier OPEC pricing policy, and the move toward greater conservation of energy, what is the possibility of a breakup of OPEC, or a reduction in the price of OPEC oil? In addition, I'd like your view as to the likelihood of an additional 5% increase being effected at midyear.

Mr. Cozad: I'll answer the last question first: I don't know. There are those who would say that OPEC is going to charge whatever the traffic will bear. However, I think they are mindful of the effects on the developed world and, therefore, will have to handle it in a way that they think will maintain the economic well-being of these countries in reasonable balance. We have thought from the beginning and still feel that OPEC is solid and will not break up.

Question: The American public seems to have a very negative view of the oil industry and little comprehension of its operations. This attitude, if unchanged, would seem likely to lead to more regulation, not less. What are your views on this observation?

Mr. Cozad: Well, I feel very badly about it. It seems to me that the people of our country and the government today know more about our business than probably any other free enterprise industry in this country. We certainly are not held in high esteem, and as I said, we feel badly about that.

Our Chairman was on Meet the Press a couple of Sundays ago and in reply to that type of a question, as I recall, said that we were furnishing something like 71 miles of computer tapes to many government agencies; we're filing 16,000 annual reports a year. Just in my area, I think we are spending something like $25 million a year filling out these reports. We have told the government that we're willing to give them anything we've got. But it seems to me they about have it all now. In one form or another, they have got a tremendous amount of information from the oil industry, and I'm sure that if they figure out what else they need, they'll be able to get it too. As to how we go about improving our posture, we would be very happy if somebody could tell us.

Question: Here is a question with a sort of reverse thread in it. Might it not be wise to keep prices artificially low domestically to encourage imports and to conserve what we have in the ground, using up foreign producers' supplies initially?

Mr. Cozad: Sure. As I said, I don't think we feel we have an energy shortage. It is a mystery to me as to why the government and we, the American people, very meekly, silently, and quietly go about paying OPEC $14 a barrel for around 42% of our oil requirements, but we choke on giving American industry the same price for our other requirements.

Now, we think that, given the price incentives, there isn't any question but that substantially more oil and gas will be found. It also is simply a fact of life that, as those prices escalate, then the other forms of energy that we are talking about are going to come into play and the marketplace will again figure out what is the right overall price of energy.

So to me, conservation is good; we should be trying to do what we can about it right now. I don't personally believe that there is a need for an extended period in which the American people are told that, "You must change your lifestyles on a permanent basis."

Goldman Sachs Seminar May 1977

Background dope studies traffic projections

Question: Do you believe that Congress will support President Carter's proposal for price controls on new intrastate gas?

Mr. Cozad: I'm sure that we're going to spend this whole year arguing and fighting about his proposal with Congress. There are many parts of it that are going to be changed. Again, if we ever get an energy policy, it's not going to be recognizable on the basis of what the President has suggested.

I don't know whether Congress will support intrastate price controls or not. Certainly, some states are not at all pleased with that. I don't think I have a feel for how it will all come out.

Question: One final question: I guess this is the bottom line of it all. If the President's message were enacted as proposed, what would your company's reaction be in terms of its allocation of dollars for exploration and development? Would they rise? And would they rise more rapidly, as rapidly, or less rapidly than the rate of inflation?

Mr. Cozad: We think that the overall effect of President Carter's program, if enacted as it is right now, would have a minus effect on the industry's cash flow. And I think it's probably correct to say that the industry, from a debt capacity standpoint, is about leveraged out. I don't think there is a meaningful amount of additional leverage possible under existing debt rating methods.

Still, I think that a great percentage of our effort would be in the exploration and production area. We feel, however, that all of our investment decisions have to meet the test of expected rate of return. And as the opportunities to invest advantageously in those areas would decline, I think the only prudent course we could take is to allocate our capital on the basis of where we thought we could get the greatest return for our shareholders.

Question: Do any other industries come to mind now where investments would make sense for your company?

Mr. Cozad: Well, we don't have any plans to look at the brokerage business.

Coal Production and Transportation -- A Detailed Analysis in the Light of President Carter's Energy Message

Mr. George Land, Director of Market Research for AMAX Coal Company.

I am pleased to have the opportunity to talk about coal. I can usually only get warmed up in 15 minutes, because coal is my favorite subject and

Goldman Sachs Seminar May 1977
[illegible] traffic projections

has been for over 30 years. The impact of the President's energy program on the coal industry in the next decade is my topic today. First, let me say I think, on the whole, the President did a good thing in bringing to the attention of the American people that we have a problem. Mr. Cozad said we don't really have an energy problem, it's a problem in economics or it's a social or political problem, and I think he is right. We certainly have adequate resources that haven't yet been developed that could supply all the energy we are going to need. And it's a matter of choice of the kind of energy we want to develop, as I'm sure you're all aware.

You have seen the numbers. Seventy-five percent of our present use is oil and gas, while something like 80%-90% of our actual resource base is coal. And just a few years ago, at the end of World War I, something like 45%-47% of our energy was still coming from coal -- having been as high as 80%-90% in the early decades of this century. So we have made the deliberate choice to go away from coal to the more convenient fuels, oil and gas, and to use some of the buzz words today, the more "environmentally acceptable" fuels, oil and gas.

But we are going to have to change some of our patterns of use, and hopefully, we won't have to go back completely to the "dirty days," if you want to call it that, of coal use. Maybe we can go back to coal use in a cleaner way.

But to get to the President's energy message, I want to read a paragraph or two. He says in the chapter on coal, "Even with rigorous conservation, America's demand for energy will continue to grow. The United States will need increased domestic energy production if it is to avoid shortages and unacceptable levels of imports.".

Well, that reads very well, but if you examine the plan carefully, you'll find that most of the emphasis is on conservation and not on increased production, and if there is a principal weakness to the plan, that is it. There are many people who find many other things to criticize; some of the taxation schemes, the carrot and the stick, and so forth.

But at the moment, let's just talk about this. "Federal policy should stimulate the expanded use of coal." Now that sounds great. I am in the coal industry.. That's what I want, to expand the use of coal. And we need a federal policy that will do that. The question is, will this federal policy do that? I will discuss that a little more later.

"Coal constitutes 90% of the U.S. conventional energy reserves, but currently supplies only 18% of our energy." That is recognized in this plan. "Full utilization of America's coal resource has been hindered, principally by constraints on demand rather than lack of supply." And that is true. We are a demand-constrained industry and have been for a couple of decades.

"Questions have been raised about the adequacy of the nation's transportation systems to deliver increased quantities of coal." And it goes on to say, "With the exception of a few areas it appears the railroads could transport the increased coal." I think that is probably true, and I'm sure that my cohorts on this panel -- two from the railroads and one from the pipeline transportation industry -- will address that in a little more detail.

"Coal development and production is most economical when it is near major markets." Hooray. This is one thing we believe. "Although coal production will expand in many areas, there should be large production increases in the highly populated Eastern and Midwestern regions where coal is used in industry and utilities could grow considerably in the future."

"The required use of the best available control technology for new power plants should stimulate even greater use of high-sulfur Midwestern and Eastern coals." The question in our minds, of course, is, should this be mandated or should this be a free economic choice?

"The expansion of U.S. coal production and its use is essential if the Nation is to maintain economic growth, reduce oil imports," and so forth.

That sets the stage. And it would seem that the plan says that we are going to use more coal, and as a matter of fact, if you remember some of the numbers, the President said we would have to have 400 million tons more coal by 1985 than we used in 1976. And in 1976, we produced 665 million tons and used about 600 million tons of it here in the United States.

So if we had 400 million tons more, that is a billion tons of use in this country, and by 1985, we might export 80 or 90 million tons instead of 65, so we are looking at a demand or production requirement of some 1.1 billion tons. By coincidence, that happens to be the number of the original Project Independence demand or production requirement by 1985.

It also is very close to the demand number that AMAX Coal Research put together last fall when we did an in-depth study for our own purposes. It's not too far from A. D. Little's number that they put out also last fall, after AMAX's study. I'm sure we had no influence on them, and they had very little influence on my study. But we were looking at 1.1-1.2 billion tons of demand by 1985 before the President's Energy Message came out, and he, lo and behold, has a number similar to that.

The question, of course, is, can we reach that number? First, let's take a look at what that number amounts to. Please look at Table 1. This is our projection of the demand for 1975, 1980, and 1985 by segment of the market -- electric utilities, "other" (meaning all other types of industrial uses), and metallurgical coal which is the steel industry, of course, and the export market. And you can see, we come up with 1,127 million tons of demand by 1985, of which the electric utilities make up almost 80%, or 800 million tons.

Goldman Sach Seminar May 1977
Background dept studies traffic projections

Table 1

U.S. Coal Demand by Type of Consumer
(millions of tons)

	U.S. Domestic				
Year	Electric Utilities	Other	Metal-lurgical	Export	Total
1975	429.3	69.9	83.2	65.6	648.0
1980	636.0	94.0	107.0	75.0	912.0
1985	806.0	107.0	122.0	92.0	1,127.0

Source: AMAX Coal Market Research.
1975 - Actual.
1980-1985 - Projected.

In 1976, the electric utilities used about 446 million tons -- or received that much in shipments. Some of it was stockpiled because the stockpile did increase a little during the year.

That means an increase, then, of 350 million tons of new demand from the electric utilities by 1985. Coincidentally, since this report was put together, the Federal Power Commission issued a new projection just about a month and a half ago of the coal demand by the electric utilities for 1985, in which they made a study of where the coal was going to come from and how much of it was already contracted for. They project 250 new coal-fired units will be coming on line between now and 1985, and that they will require 357 million tons of new coal.

Well, add 446 and 357 and you come up pretty close to the number I have up there already. And this was done also before the President's Energy Message. Of that 357 million tons of new demand by the electric utilities, according to the Federal Power Commission study, 68% is already contracted for, already committed, which means that the coal industry has already planned new coal mines to supply at least that much, at least that 68%.

As a matter of fact, we have planned new coal mines for considerably more than that. Table 2 shows our estimate of new production capacity by type of mine by producing area of the country. Again, these projections were

Table 2

Production and Capacity Increases by Type of Mine
(millions of tons)

	1975 Production			New Mine Capacity					
				1975-1980			1975-1985		
	Total	Surface	Deep	Total	Surface	Deep	Total	Surface	Deep
Appalachia	397.9	171.7	226.2	101.8	8.8	93.0	136.1	10.3	125.8
Illinois Basin	139.5	82.9	56.6	39.9	18.2	21.7	72.4	30.3	42.1
Western Interior	20.9	20.9	--	16.5	16.3	0.2	21.8	20.8	1.0
Western	89.7	78.3	11.4	168.2	149.5	18.7	261.3	232.8	28.5
Total	648.0	353.8	294.2	326.4	192.8	133.6	491.6	294.2	197.4

made before the President's message. You can see we're projecting a total increased new mine capacity of 136 million tons in Appalachia, 72 million tons in the Illinois Basin, and 21 million tons in the Western Interior.* And I have in the western area 261 million tons of new capacity, for a total of 491.6 million tons of new capacity. This is divided 294.2 million tons from surface and 197.4 million tons from deep mines. This estimate is based on what coal-industry companies have projected, new mines they have in their plans that are now going forward.

In 1977, if we don't have a new mine already in the process of development, we won't have it onstream by 1982. It takes at least five years now to develop a new coal mine. And two years of that is the preliminary environmental work that has to be done, the environmental baseline studies, and all those kinds of things. If you want the mine in 1985, your're going to have to start work on it in 1979 or 1980.

So this is my projection for new capacity. But supply and capacity are two different things. In 1976, we produced 665 million tons; that was the supply. But we probably had a capacity of something on the order of 720-730 million tons, nobody knows exactly what total production capacity is if every mine were able to run five days a week, fifty weeks a year without the strikes and the other problems that we've had in our history.

As shown in Table 3, with new mines, supply will total 943 million tons in 1985 if we run at 90% of capacity, which is about what we think we ran in 1976. Total capacity is then something like 1,000-1,048 million tons, which is short of demand by 100 million tons or so, and the supply is short by 180 million tons.

Now that doesn't mean we're not going to have the coal we probably need. It simply means that as now projected, our new mines will not cover what we see as a potential demand.

If we are permitted to mine the coal and if the people who want to use it are permitted to use it, all of this will come into balance and I think we'll have enough capacity to cover the 1.1 or 1.2 billion tons of need by 1985.

But they're a couple of big ifs, and that's what I want to touch on briefly now. The President keeps saying we need more coal and we're going to force people to use it — to force them to in some cases and to encourage them in others. There are programs to tax the gas users and oil users if they don't switch to coal and also to give the utilities tax credits on new equipment to burn coal; all that looks great.

---

*Appalachia is the Pennsylvania, West Virginia, East Kentucky, Tenessee, Alabama, and Virginia coal-producing areas. The interior of the Illinois Basin is Illinois, Indiana, and West Kentucky. The Western Interior is Missouri, Iowa, Oklahoma, and in this analysis the Texas lignite fields (in some analyses they are in the Western). The Western Basin is all the mountain states and the northern Great Plains — North Dakota, Wyoming, Montana, Colorado, Utah, New Mexico, Nevada, and Arizona coal fields.

Goldman Sachs Seminar May 1977
Background docs including traffic projections

Table 3

U.S. Demand, Supply, and Production Capacity
(millions of tons)

Year	Demand	Supply	Capacity
1975	648	648.0	720
1980	912	875.4	973
1985	1,127	943.5	1,048

(a)Assumes that production averages 90% of capacity.
1975 is actual production.

But on the other hand, in the message and in Congress, there are many proposals to hinder the progress of the coal industry, to shackle our attempts to bring new mines up to production. The new strip mining bill, just passed by the House and still in the Senate, has some restrictions that we in the industry believe are unnecessary to protect the environment, the interests of the landowner, and the future of the country, because we believe land can be restored. We're doing it every day. One of our problems, of course, is when we do a good job nobody knows. You can drive past 100 miles of reclaimed farmland where the coal mines were and you'll never know it because it's being farmed. You pass one high wall that wasn't reclaimed, and everybody immediately screams strip mining because you can see it. So when we do a good job we don't get any credit for it.

But, nevertheless, the provisions of the Strip Mining Act, as now envisioned by both houses, will pile another layer of bureaucracy on the state control, which already exists and is adequate in most states. It will pile another layer of bureaucracy on that and will actually retard production and take out of potential production a good part of the western, easily minable, quickly recoverable surface mining coal that we're going to have to have if we're going to come anywhere near meeting this goal of new production.

The other serious roadblock is on the use side, namely the Clean Air Act and its potential amendment. The Clean Air Act, as it is now written and enforced, puts severe restrictions on the amount of sulfur dioxide that can be emitted into the air. New source performance standards for coal-fired plants is 1.2 pounds of sulfur dioxide per million BTUs of heat input. Hearings will be held at the end of this month by the EPA, as they must under the provisions of the Act and because they've been petitioned by the Sierra Club and a couple of Indian tribes, with the idea that maybe they should make that standard even more restrictive, making it more difficult to use a high-sulfur fuel or even a low-sulfur fuel, like low-sulfur coals. This is going to be a severe problem to us.

And let me drop one other thing on you just as a going-away present. By the regulations as they're now written regarding emissions of sulfur from new coal-fired plants, there may not be any compliance coal in the United States. Despite the hundred billion tons of supposedly compliance quality, there may not actually be any because the regulation says that you may not emit more than 1.2 pounds of sulfur dioxide per million BTUs in any three-hour span; that is, the average for any three hours cannot exceed 1.2 for the life of the plant -- for the whole 30-year life of the plant.

So if you know anything about variance and variability -- if you know anything about statistics -- you realize that even though the average quality may be well below that limit for a particular coal deposit, there will be variations. This means that out of the billion-ton reserve for a 500-megawatt plant, any 500- or 600-ton lot of coal that would burn in a three-hour period cannot exceed the standard. It would be only 150 tons for a 200-megawatt plant. On that basis, there probably is no compliance-quality coal in the whole United States. I'll leave you with that. Thank you.

Mr. Thomas Hamill, Vice President-Core & Ore Traffic
Norfolk and Western Railway Co.

I appreciate very much the opportunity to appear on this panel to discuss the railroad's role of transportation of coal as its use as a major fuel grows in the United States.

There are few reasonable men who would question that we should practice conservation and use our energy resources wisely. It has been almost four years now since the OPEC oil embargo, four years that have been filled with considerable rhetoric regarding a national energy policy. Study upon study has been made, some suggesting that we should become energy self-sufficient by 1985, a time that now is less than eight years away. These studies recognize that coal is our most abundant fuel and that production to achieve our self-sufficient goal should reach the billion-ton mark by 1985. Last year, approximately 665 million tons were produced, which means that production should be increased about 350 million tons by 1985, or about 45 million tons (6%) per year over current levels.

In a recent interview on CBS, the president of the National Coal Association stated that annual coal production could be increased 100 million tons with the mines in operation today. The billion-ton figure could be reached, he stated, providing some modifications were made in the restrictions imposed by the government on the mining and the burning of coal.

We at Norfolk and Western have frequently discussed future production with coal producers on our railroad. We have concluded that they have excess capacity and could raise their output from existing mines as much as 20% above the 67 million tons that they produced last year, to approximately 80 million tons. In addition, we expect 21 major new coal mines to become operational on our railroad before 1980, adding an ultimate annual capacity of 24 million tons. However, if our nation is to obtain the billion-ton

Goldman Sachs Seminar May 1977
Background depe success traffic projections

rate of production, it must open additional mines and expand transportation facilities. Now this won't happen overnight. It takes four to five years for a mine to reach its potential production.

Some people have found it to their advantage to question whether the railroads will be able to meet the challenge of this expanding coal production. Indeed, it has become almost fashionable in some circles to say that railroads won't be up to the task. The only problem is that that simply isn't so. (I am talking here specifically as a representative of the Norfolk and Western Railway, but the thrust of my comments on the question of capacity holds true for all railroads, at least in general terms.)

First, we have the capacity right now to move substantially more coal than we are hauling. In 1969 and 1970, the N&W originated about 80 million tons of coal compared with 67 million tons last year. Our coal hopper fleet capacity in tonnage, locomotives, and track structures hasn't changed substantially since that time. In other words, we have the demonstrated capacity to take a 20% jump in coal traffic right now if through some miracle that much additional coal production suddenly developed.

Our coal transloading facility at Norfolk, Virginia can also handle additional traffic. Its record volume for one year was 34 million tons, or some 35% above last year's level. Before cheap South American oil and environmental restrictions led to the conversion of new eastern seaboard utilities from coal to oil and gas, we loaded quite a bit of coal onto barges at Norfolk for shipment to utilities along the coast. We have the capacity to do so again.

This unused capacity doesn't begin to consider the additional coal hauling capability we can add to our system. Let me give you a few examples:

1. We are currently rehabilitating our Wayne, West Virginia branch line so that we'll be able to serve a new coal mine that is expected to produce in excess of 2 million tons a year. This tonnage will all be handled in 100-car unit trains. And this mine, as I said, is scheduled to open next year.
2. We design and build our own coal hopper cars in our shops in Roanoke, Virginia, our headquarter city. We currently are building 100-ton-capacity cars in the shop at a rate of five per day, which we consider adequate to meet expected demand for present coal traffic.
3. If conditions warrant, we can step up that production as high as 16 cars per day. With the long lead times for opening more new mines, I can foresee no problem for us to acquire additional hopper cars or locomotives to meet increasing coal traffic levels.

At 16 cars a day, we can increase our coal-carrying capacity by 7.5 million tons a year. We have the financial strength to do whatever is necessary in the way of plant and equipment expansion. At the end of 1976, we had $229 million in the bank in cash.

Being associated with one of the largest coal-hauling railroads, I would be remiss not to point out how much the coal-producing and -consuming industries have contributed to the lifeblood of the railroad industry. Coal is the largest single commodity the railroads handle, and they handle it efficiently. During 1976, coal production reached an all-time high of slightly more than 665 million tons. The various detailed statistical tables are not available for 1976; however, using the latest information from 1975 when approximately 650 million tons were produced, the railroads moved 420 million tons or two-thirds of that total, requiring about 315,000 hopper cars. Coal traffic during this period generated slightly over $2.1 billion in revenue for the railroads.

In other words, what I am saying is that the railroads, coal producers and consumers, because of their interdependence and relationship over the years, have developed a spirit of cooperation and understanding in solving mutual problems concerning the movement of coal, benefiting all those involved. The energy crisis has imposed new problems on these industries, and I believe greater efforts must be exerted through this spirit of cooperation to obtain still greater efficiencies in the handling and transportation of coal.

During the last decade, we have seen great changes in coal transportation and also have laid some groundwork for the future. Speed, improved efficiency, increased productivity, and greater utilization have become bywords to all of us. Today, even greater emphasis is being placed on them.

One particularly noteworthy development has been the unit train concept, coupled with fast loading at the mines and fast unloading at the destination to improve the turnaround time of this equipment. In some cases, special loading and unloading facilities permit the train to continue in motion, stopping only for fuel and routine inspection. Operations of this type require coordination between the shipper, carrier, and receiver from the earliest planning stages of the mine and the consignee's plant. Under actual operating conditions, a balance must be maintained between loading, transportation, and unloading so that no single part becomes a bottleneck. In 1975, approximately 170 million tons, or 40% of the coal hauled by railroads, was moved in unit trains. This percentage will undoubtedly increase.

We are quite optimistic over the prospects for better car utilization in the future. New mines being opened on our line are mostly large mines capable of producing up to 5 million tons per year and equipped to stockpile and load 10,000-ton unit trains in a period of four hours or less. Likewise, as new electric utilitiy plants are being constructed, facilities for fast unloading of unit trains are incorporated in plant design. Consequently, railroad car utilization will greatly improve in future years.

As an example of unit trains already operating on the Norfolk and Western, about 5.5 million tons of coal annually are transported in 200-car trains to Duke Power's plant near Winston-Salem, North Carolina. The roundtrip distance from the several mines involved approximates 700 miles. And, roundtrips are consistently made in less than three days. In Ohio, one set of equipment makes three trips per week carrying 10,000-ton trains from an Ohio mine on our line to a plant of Cleveland Electric Illuminating Company.

In conclusion, I would note that, to keep abreast of the coal markets, we maintain close contact with our coal consumers and producers and the various governmental organizations both on a federal and a state level. This type of alliance permits us to keep our fingers on the pulse of the market, which, in turn, allows us to make reasonable and intelligent forecasts of the coal market. There is no question in my mind that the railroads as a whole can be called on to meet the challenge set forth for 1985.

Mr. John Timberlake, Director of Unit Train Operations
Rio Grande Industries, Inc.

It's a real honor to come galloping out of the West in our white hats to see what we can do to help the President save the country. Some of us have been looking forward to this day for ten years or more knowing as early as 1963 that we were due to start to run out of BTUs from all of the available sources. It's easy to Monday-morning quarterback, but that's what some of us at least were doing.

I'd like to address you rather briefly on Carter's speech, wherein he asked the coal industry to come up with an additional 400 million tons by 1985. Obviously, one of the uses of the coal is going to be in new coal-fired power plants. While not of equal importance but still quite important, a great deal of that coal is going to go back to those plants that were originally capable of burning coal and were then switched to gas and/or oil. And another area where we think there is considerable future for steam and western coals is in the conversion of industries that right now are gas and petroleum based, particularly the heavy chemical complexes along the Louisiana and Texas coasts as well as larger manufacturing plants.

Granted, there is an environmental problem: Can you burn it or can't you? I don't propose to get myself in the middle of that argument, but if you want heat, steam, or power, you're going to have to do something. The proposition that Goldman Sachs put before us was "Should the nation be able to produce and burn our coal reserves within reasonable environmental standards, will we have adequate transportation capacity to move it from the mine to the point of consumption?"

Goldman Sachs Seminar May 1977
Background depos studies traffic projections

I would like to ignore for the moment the question of the regional allocation of this coal production, whether it's going to be in Appalachia, the Midwest or the Far West. The reason I do so is to try to give you, as financial people, an idea of how those of us who have to design and run the trains figure out the answer. Let's look at it in two ways. First, in terms of the equipment; a number of people have pushed the panic button and said, "The railroads cannot possibly handle it; they cannot produce all that equipment." The second aspect is line capacity. So, I'm going to ask you to go through with me a rather simplistic exercise.

The goal is an additional 400 million tons a year by 1985. The way I look at that is to ask, "What does this mean in terms of train systems?" Since we're in the West and our trains are going to be running pretty long distances and a great bit of the time over connecting carriers, let's take the worst case, to be conservative, and say that there is a 1-million-ton capacity in each train system. Now, I'm going to say that each million-ton system turns on a seven-day basis; as perspective, I've got trains that turnover a 1,000 miles in four days. But being ultra-conservative, let's say that a million-ton system turning in seven days requires two standard unit trains. Everybody in the West, including our little mountain railroad, thinks of this as a 100-car train of 10,000-ton capacity, with four or five locomotives depending on how you organize it. Granted the Rio Grande is different because of our territory, which I will get to later.

But in general, to then move 400 million tons will require 400 train systems, each having two trains in it. To the extent that all those systems could turn in three days rather than seven days, one single set of equipment will handle that million tons. Therefore, to move our 400 million tons, we need, at the outside, 800-train sets of cars and locomotives, and that is the entire equipment production that the President's program asks for. That means that we need an additional 92,000 cars and 3,680 locomotives.

If you want to get some idea of the financial feel for that, at today's prices of say $550,000 for a locomotive unit and about $30,000 for a car, we're talking about $2.02 billion for locomotives and $2.76 billion for cars. Spreading that over eight years means that we are not talking about a really large amount at any one time when you consider the number of railroad carriers involved. Whether those of us who are going to be involved are going to be able to generate all of that money is a question of whether we're going to be allowed to charge the rates we'd like. But, that's a brief outline of what is required in the way of equipment.

Now, let's look at line capacity. Take the 400 million tons and break it into units of 10-million ton blocks. For each 10-million-ton block of production, again using our seven-day turnaround train, we need three dispatches a day; in other words, we have to dispatch, load, and move, over the entire country, an additional 30,000 tons of coal a day for each 10-million-ton block. An additional 30,000 tons a day means that only three 10,000-ton trains per day have to move for each 10 million tons. Since there are 40 such blocks, there is needed 120 additional unit trains per day, again spread throughout the whole network.

Now there is an awful lot of railroad out there. In the West, let's assume that we get 60% of the added 400 million tons, probably a low figure. That means all of the railroads in the West would have to dispatch 72 additional unit trains a day. You spread that out over the Burlington Northern, the UP, little old D&RG, the Sante Fe, and the others, and you see the added traffic is certainly not a problem that's going to stop the railroad industry.

If you look at the network layout of the Rocky Mountain and the Northern Great Plain regions, you get a feeling of how this added volume can be handled. This area runs from the Canadian border toward the Northern Great Plains fields down through Wyoming, Colorado, and Utah, then down to New Mexico. Now think of this in relation to the gateway cities to feed the Southeast, the Midwest, Texas, Louisiana, Arkansas and also to go to the West Coast. You see that in terms of rail corridors available, all of the lines involved moving East are financially strong and healthy and hopefully have the necessary resources to handle both the equipment and possibly any line capacity problems. There really is not a line capacity problem.

On the North end, from the Wyoming and Montana fields, you've got Burlington Northern covering the northern tier both East and West and down into the Midwest. The Burlington already knows the areas in which it presently has capacity problems -- the two lines coming down through the Powder River Basin and going out toward Omaha and to some extent their line in Texas. The BN is already working on those problems.

Even the C&NW, which taps into that same area, is trying to do something about it. The UP through the southern tier of Wyoming is one of the finest railroads in the world. The UP doesn't have a capacity problem. They'll have fun interspersing coal trains along with their general freight, but they have the basic capacity and the money to do anything they need to do to get more with it. From Colorado and Utah, the D&RG is in pretty good shape, and we don't see any huge and insurmountable problems keeping up with our share of the demand before it really hits us. We've got the right-of-way and from that we can build up as the need begins.

If one goes to the South, one has the Santa Fe running through those fields, most of you know about their building the Starlight line up into New Mexico or getting ready to go on that. Again, it's a strong railroad with adequate capacity now and the capability to increase its capacity.

Now, a couple of comments and numbers on line capacity in the West. First, I want to point out that in the Rocky Mountain areas, we don't have the big problem of deferred maintenance. What we have is branch lines and main lines built and maintained to the standards and to the levels of traffic that operate over them. It is not like the problems faced by the railroads in the East. We're not looking at any deferred maintenance problem, but rather an upgrading problem; for example, our Craig line, up to northwestern Colorado that was built to handle one freight train one way each day and one passenger train some years ago, is going to have 15 million tons of coal imposed on it some time in the next ten years. That's

Goldman Sach Seminar May 1977
Background docs - Sachs traffic projections

an upgrading problem. So we don't have a vast store of deferred maintenance problems; ours is the happy thought of buiding anew or rebuilding.

Now, let me give you some numbers rather quickly. We have 85- to 100-pound rails on that northwest line. We'll probably upgrade that so when we're finished with the first step it will have 119-pound rails. At today's prices, that kind of upgrading costs $136,000 a mile -- the first step in starting to get our capacity up. Where we have a relatively light-duty main line because it's been handling general freight trains of all tonnages, that's going to have to be upgraded to a 136-pound rail. That upgrading job runs us $141,000 a mile at today's prices.

To raise the capacity of a single-track line, we start with CTC (central traffic control) -- we've just finished CTCing 72 miles of the northwestern Colorado line for about $3.8 million, $52,800 a mile, on a rough basis. If we really get in a crunch, we finally can go to double track with CTC. We have the right-of-way, but must broaden the road base, put in new ballast and rails and so forth; right now, that would run $232,000 a mile. Now that does not include the bridges, signals, and that sort of thing.

With our own program, this year we'll lay 52 miles of rail for about $6.5 million. Our five-year program is 60 miles of new rail a year and about 20 of relay rail. If we are able to carry forward that program, we'll have over 75% of our main line in 136-pound rail -- and that's the 75% that will be carrying the coal.

Regarding the 92,000 cars that I spoke of earlier, in the last three years, the railroads have ordered over 38,000 open-top hoppers, or 16,000 cars per year. The car builders have delivered 46,000 or 15,400 cars per year. In the last three years, the builders delivered 191,000 cars of all types or better than 63,000 cars a year. So, if you look at our 92,000 cars over the next ten years, the car building capacity is in place provided we can get the castings. General Motors is capable of building about 1,440 locomotives a year, and that's without any expansion or any of the things that GM can do. There is no problem building the 3,680 units the energy program needs.

In the West, a total of 119 million tons of coal was produced in 1976. Wyoming was about 39 million tons according to my numbers. Our area of Colorado and Utah was about 14-16 million; the FEA said 14 million. FEA figures released two days ago with the American Mining Congress said that in 1980, Colorado and Utah would be producing around 45.1 million tons, but I cannot quite believe that; the D&RG thinks we're going to be producing and hauling somewhere between 30 and 34 million tons by 1980. This year, we were projected to produce 15.0-15.5 million. Optimistically, in 1985 we could be at 70 million tons on the Rio Grande. Now that's pure optimism, you know, with the slippage we could get in 1980-1985.

In 1977, we're looking at coal revenues on the Rio Grande of about $52 million, we think. In 1980-1985, it may be up to $140 million. We now run 47-50 unit trains a week. To handle 30 million tons in 1980, we'll add about 15 trains a day including the empties coming back. That is not an insuperable problem over our railroad: We have to run two loaded trains for every 10,000 tons because of the mileage. To handle our 15-million-ton increment by 1980, we probably need on the order of 75-80 more locomotives, perhaps 1,000 more railroad-owned cars and maybe a 1,000-1,500 private-line or shipper-owned cars working on our railroad.

I'd like to close this by simply saying, as a representative of a small railroad that runs in and out of the canyons, up and down hills, we think we can handle our portion of the job. We know that our big brothers to the North and the South are going to be able to handle everything that is thrown at them.

Mr. W. Pat Jennings, President
Slurry Transport Association

I appreciate this opportunity to come here and present the story of a somewhat new industry. President Carter's call for increased coal production raises two basic questions that need to be addressed in any discussion of energy transportation. And these two questions are capacity and competition. "Will there be adequate capacity to ship the great volumes of coal needed to shift the energy load away from oil and gas as rapidly as the President wishes?" And, "Will there be the discipline of competition to control the significant cost of handling coal over long distances from the mines to the power plants?"

Now, the railroads handle 64% of all U.S. coal shipments. But most of the traffic, better than 80% of it, is in the East and the South. The western railroads account for less than 20% of all rail shipment of coal, about 70 million tons, only a third of the eastern volume. The problem we face with increased coal utilization is that much of the new coal production will be in the West.

The FEA says there were 510 million tons of coal produced in the East in 1974, 93 million tons in the West. But for 1985, the FEA estimates production of 661 million tons in the East, a 30% increase, but for the West, the forecast is for 379 million tons, an increase of an amazing 380%.

Now there is absolutely no evidence to convince the prudent man that the increases of such magnitude can be handled by the western railroads. Indeed, a prudent man would demand a backup system. The western roads were not built to carry coal in the first place, as we've just heard, and they are in a sad state of disrepair. But fortunately, there is an alternative. If the President is serious about increased coal utilization, and I believe that he is, he'll want a coal transportation system to supplement the existing railroads. Otherwise, the American people will be at the mercy of a few railroads.

The President seeks to reduce our dependence on foreign energy resources, and we think he should try also to reduce our dependency on a single mode

Goldman Sach Seminar May 1977
Background depositions traffic projections

of transportation. The President favors competition and we do too. We believe there must be an alternative transportation system, and for western coal, slurry pipelines are the only alternative available.

Slurry pipelines are not new. The idea of transporting pulverized coal in a liquid goes back to the 1890s. The modern era of coal slurry pipelines began 20 years ago with the construction of a 108-mile Consolidation Coal pipeline between Cadiz, Ohio and a generating plant of the Cleveland Electric Illuminating Company near Cleveland.

In 1970, the 273-mile Black Mesa Coal Pipeline was completed. This is the world's largest coal slurry pipeline in operation today. It transports coal from Arizona to a 1,500-megawatt generating station in southern Nevada; it delivers the coal invisibly, reliably, and economically.

There are currently other coal slurry lines in advance stages of planning. One of the major ones planned by the Houston Natural Gas Company and the Rio Grande Industries is the 900-mile line from southeastern Colorado to the Gulf Coast of Texas where 97% of the electrical energy is produced by natural gas and oil. Also under consideration, by the Energy Transportation System, Inc., is a 1,000-mile line from the Powder River Basin in Wyoming to Arkansas. And then there's a system that will carry coal from the mines in eastern Utah to new power stations in Utah and Nevada. Two other coal pipelines are also planned in the West; both would originate in the Powder River Basin, and one would deliver coal to Texas and the other to Oregon and possibly Washington.

The technology involved in coal slurry pipelines is relatively simple. At the preparation plant near the mine site, the coal is ground to the consistency of sugar and combined with about an equal part of water. The resulting slurry mixture then is fed into the pipelines; pump stations are spaced at approximately 80-100 miles along the route, maintaining the flow as the slurry moves to its destination, which is usually a power plant for a major population center. At the power plant, the water is removed from the slurry mixture and can them be used as part of the plant's cooling system, reducing the local water requirements by about 12%. If not used for cooling, the slurry water can be purified to meet standards for any other disposal. After dewatering, the coal is used to generate electricity just as if it had arrived by any other means of transportation. It could also be fed to a gasification plant or loaded on a barge for further shipment.

The distance from western coal deposits to the large population centers where the energy needs are great range from 800 to 1,600 miles. And traditional carriers of western coal, the railroads, in my opinion, cannot handle the vastly increased production alone. But coal slurry pipelines in combination with the railroads can play an important role in helping America meet its energy needs.

As an energy transportation system, coal slurry pipelines have important advantages. First, slurry transportation is economical. Slurry lines,

Goldman Sachs Seminar May 1977
Background dope - successes traffic projections

like all pipelines, are capital intensive and the major costs are accounted for once the pipeline has been constructed. Inflationary items such as labor, electric power, and materials for maintenance are minimal, accounting for only about 30% of the budget. Railroads, by way of contrast, have well over half of their expense subject to inflation. The Black Mesa pipeline system, for example, requires only 52 permanent employees and that includes administrative and technical personnel. Savings to the utilities served by the Black Mesa system are nearly 50% of the alternate rail transportation costs. And savings by slurry pipelines increase for long-distance, high-volume systems such as those now being planned.

Middle South Utilities, which would receive coal by slurry pipeline, has estimated savings of $14 billion in transportation costs of 25 million tons over a 30-year period. This is the estimated minimum life of a steam generating plant. Were these savings not realized, the costs would have to be passed on to the consumers.

The slurry lines mean more than dollar savings to utility customers. The Black Mesa line reports a reliability rate of more than 99% for their pipeline delivery system. Slurry pipelines offer a reliability that is difficult, if not impossible, to achieve by other transportation. And the underground pipelines are not affected by weather such as snowstorms or freezing temperatures or by surface accidents or traffic congestion, and a high degree of automation adds to this dependability.

Environmental considerations make coal slurry pipelines an attractive proposition to residents of states through which the lines pass. Unlike rail operations, coal slurry lines are noiseless and invisible and do not generate air pollution. And they're free from grade crossing hazards. For residents along the route, this is a real problem, and pipelines are far the least disruptive means of carrying coal.

Disruption during the construction phase is minimal. It takes only a few days for a pipeline construction operation to move past a specific point, and after construction, the right-of-way can be returned to its former use and coal-water slurry mixture is safe, being both nonflammable and nontoxic.

Water use in slurry pipelines is an issue of some concern to residents of some western states. Pipeline builders, like other industrial users, must seek local approval for any water that they use. Residential and agricultural users always get top priority. Often, slurry pipelines seek water by drilling deep wells, tapping underground water formations that are not economical for either residential or agricultural uses. For the Black Mesa pipeline, deep wells were sealed off to a depth of 2,000 feet, to protect shale oil and water formations and springs that might be feeding Indian wells.

Fortunately, slurry pipelines can be available quickly and in time to meet the vastly increased production of the 1980s. It takes about three years to plan and build a major pipeline. Several slurry lines could be developed quickly if the necessary rights-of-way could be obtained. However, the railroads are delaying construction by refusing to allow slurry pipelines to cross beneath their tracks. But this is the latest chapter in the long fight against pipelines for liquids.

It goes back a century to Pennsylvania when the Columbia Conduit had to take its oil across railroad tracks in tank wagons, then pump it back into pipelines. The state finally broke that blockage, but the railroad obstruction lasted until World War II. Congress finally stepped in with eminent domain powers to clear the way for the vitally needed long-distance petroleum lines. Members of the slurry transportation industry are seeking the right of eminent domain now from state legislatures and from the U.S. Congress. Other pipelines and railroads have similar rights under state law. Several states already have acted for coal pipelines. States that have the right of eminent domain are West Virginia, North Carolina, Utah, Ohio, and just recently it's been granted by Oklahoma and in Texas.

A nationwide authority would grant eminent domain under legislation now before the Congress, and in my opinion, the energy crisis requires that this be enacted. So that's where we stand. We're ready and willing but unable to go.

We're asking Congress to establish a procedure to make construction of coal pipelines possible. Our bill provides no federal funding, approves no single pipeline, and appropriates no water. But it would permit a properly certified pipeline builder to exercise the carefully protected right of eminent domain for the acquisition of rights-of-way. Hearings have been conducted in the House, and we expect favorable action very soon. Although the administration has not developed a position as yet, Dr. Schlesinger has said publicly that he personally favors this type of enabling legislation.

Now virtually everyone who is familiar with the coal slurry pipelines believes that the pipelines can provide substantial savings to the consumer. Two examples from the recent House hearings demonstrate the need for competition in coal transportation. In Oklahoma, the public service company opened negotiations in 1975 with Burlington Northern and Missouri Pacific for the delivery of 50 million tons of Wyoming coal. The initial rate quoted was $6.48 a ton plus $20 million dollars for the purchase of coal cars that added an extra $2.26 a ton to the rate. When the utility finally signed the contract last month, the $6.48 base rate had jumped 32% to $8.57 or a total of $10.83 a ton.

And incidentally, in testimony that was presented to the House, it was indicated that the public service company in Oklahoma was obligated under the tariff to take or pay for a minimum of 2.6 million tons of coal for a 20-year period. But the railroads claimed that they could not make such long-term contracts. In Texas, the City of San Antonio got a quotation of $7.90 in 1973 from Burlington Northern. That figure increased to a proposed rate for this year as high as $17.34 a ton. Acting on the city's complaint, the Interstate Commerce Commission has issued an unusual order to reduce the rate. It's still over $11.00 a ton, exclusive of the additional cost of city-owned coal cars.

There's another important part in the San Antonio case worth noting. When the city pointed out that others received less expensive coal transportation, the Burlington Northern argued that the comparison was unfair -- the other areas were, the railroads said, and I quote, "depressed by competition." Is it any wonder that the City of San Antonio filed a statement in support of our coal slurry pipeline legislation?

In summary, we think that the President was absolutely right in asking for greater coal production. We share his sense of urgency about future energy needs, and we think every bit of available technology will be needed to produce and deliver more than a billion tons of coal a year, including coal slurry pipelines.

In my opinion, this is not a question of pipelines or railroads. It's a question of pipelines and railroads. It isn't a question of eastern coal versus western coal; it's a question of eastern coal and western coal. It isn't a question of deep-mined coal versus surface-mined coal, it's a question of deep-mined coal and surface coal.

Question: Mr. Land, is there any technological process on the horizon that will remove sulfur from coal at the source? And if so, how much will it cost and how much will this impact the price of coal? And secondly, can eastern coal be produced at the rate you suggest in light of the unstable mineworkers labor force?

Mr. Land: Let me try that last one first. We do have a problem with labor in the coal industry. Mr. Miller is in trouble with his union, which is highly fractionated, and his re-election bid is very uncertain. And because of the delicate nature of the negotiations that are going to face us when the election is over, that's about all I want to say about it.

But it is a problem. We have had long periods of relative labor stability in the industry. The miners have always been an independent group of people. We think that they will learn to live with us. One of our problems of course is we have a generation gap. In underground mining, particularly, we have many new young men who have come into the industry; we have their grandfathers who are in the industry, but their fathers are missing. They didn't come into the mines in the years right after the war because the coal industry was dying, everybody knew it if you remember in the 1960s. The coal industry was put in its coffin, nuclear was going to take over the energy industry. So that generation didn't come into the mines, and we have a peculiar mix in our labor situation.

As to the technology for removing sulfur at the source, I presume you mean removing sulfur in the coal before its shipped

Goldman Sach Seminar May 1977
Background depressed traffic projections

away from the mines or before it's burned. There are mechanical means of removing sulfur a certain amount. But one of the problems is that there are two kinds of sulfur in coal. The organic sulfur is not removable except by chemical methods. The other kind is pyritic sulfur, which is a mineral sulfur; it can be removed by mechanical means. The degree of removal depends on the way the sulfur is in the coal -- from some coals you can take a lot out, and some you cannot take very much out. So it's a mixed bag.

Generally, if you can remove the sulfur mechanically it's cheaper than scrubbing it out or taking it out chemically. Government agencies are working on a combination of processes and things of that sort. But I don't expect any sudden turn-on of new technology to be the answer to all our problems.

Question: Mr. Hamill and Mr. Jennings, what is the cost per ton-mile, including capital cost, of either a slurry pipeline or a rail unit train moving over a 100-mile distance at your definition of full capacity?

Mr. Hamill: I don't think I can answer that question today. I don't have the figures.

Mr. Jennings: As I pointed out, both distance and volume are great factors in the cost of transportation. Let me point out that the cheapest way to transport coal is by barge if the waterway is there.

Second, I think for a short distance such as 100, 200, or probably 300 miles, except under specific circumstances, the railroads are probably more efficient than the slurry lines. It's when you start increasing volume and distance that the advantage swings to slurry pipelines and the gap really tends to widen. I think the best answer to that question is, let's let the marketplace determine which method of transportation is going to be used.

Question: Mr. Hamill, will deferred maintenance on track, particularly for the eastern railroads, be a problem from an operating or financial standpoint in regard to the anticipated increase in coal hauling?

Mr. Hamill: Well, I cannot speak for all the eastern railroads. I can speak only for Norfolk and Western, and we do not consider that we have any deferred maintenance.

Question: Mr. Timberlake, could you comment on the Burlington Northern-San Antonio rate case decision as it relates to future profitability of the unit-train concept, and do you view this particular decision as an important precedent-setting decision?

Mr. Timberlake: The commission went to fairly great pains to say that it was not precedent setting, that it applied only to that particular circumstance, and the Circuit Court seems to have alledgedly said the same thing. Personally, I view it with a great deal of concern.

The basis on which the commission made its decision, that is, the economics that they pursued, were certainly not realistic. You, ladies and gentlemen, more than anybody else in the country know that a 5% return on your imbedded capital before tax is ridiculous. Now, if the commission's view of capital formation, capital cost of the equipment and return on capital, were to become precedent -- if we were to be made an instrument of social policy -- we'll all be nationalized. So I view it with a great deal of concern. You're talking essentially about what may become national policy.

We can go one of two ways in the railroad industry. Hopefully, we'll be allowed to build the industry to perform the service that it's supposed to perform and is capable of performing -- not only in hauling the coal but in handling the general freight. If, by artificial means, we become a victim of social policy in order to hold the costs down to the consumer, eventually the real cost is going to have come out in the consumer's tax bill.

Question: Mr. Land, you referred to the recent FPC study regarding coal requirements by 1985 that focused on new coal burning plants for utilities. The study did not allow for fuel conversions among existing units. If you assumed a reasonable number of conversions, what would this do to your 1985 demand picture, and in your projections of supply, to what extent did you take into account the depletion of present mines?

Mr. Land: It will increase demand if there are conversions, but at the moment, it looks like that increased demand might be offset by a decreased growth rate. The emphasis on conservation, insulating homes, more efficient electrical appliances, and other steps should, by 1985, begin to lower the growth rate of electric utilities from what I projected.

In our projections of capacity, I used a depletion rate of 3% a year on existing capacity of coal mines. This means the average life of coal mines is about 33 years.

Question: Mr. Jennings, could you submit evidence to support your statement that the western railroads, including the highly profitable UP and Santa Fe, are "in a state of disrepair?"

Goldman Sach Seminar May 1977
Background dope & success traffic projections

Mr. Jennings: Well, I think that what you have to do is observe the railroads and hear them explain how they are going to spend great sums of money in upgrading the roads, originally built for grain and for light shipments, to transfer them into coal-hauling lines. This would appear to me to be sufficient evidence to justify that statement.

Mr. Timberlake: I will repeat my statement that the main line tracks of the Union Pacific, the Burlington, Santa Fe, or the Rio Grande are in top shape by anybody's standard. What I was talking about, in terms of the rehabilitation, is the spurs serving some of these new mine developments that were built for grain and cattle and so forth. But if you look at the layout of the UP and the Rio Grande -- and to some great extent the Burlington -- the basis of those light-duty lines is already there and the work is already begun to upgrade those lines in anticipation of this flow of coal. So, I categorically deny that the western railroads are in any kind of disrepair.

Goldman Sach Seminar May 1977
Background dope-success traffic projections

Goldman, Sachs & Co. | 55 Broad Street | New York, New York 10004
Tel: 212-676-7489

Michael R. Armellino
Vice President
Investment Research Department

Goldman
Sachs

May 5, 1982

Mr. J. E. Timberlake
Director--Unit Train Operations
Denver and Rio Grande Western Railroad
P.O. Box 5482
Denver, CO 80217

Dear Jack:

I am most grateful for your efforts in arranging my meetings at Rio Grande. All of your associates were very generous with their time and educational in their responses.

Hopefully, on my next trip, we can have a relaxed dinner, and I promise not to mention a coal unit train or a freight rate. Thanks again.

Cordially,

Mike

Michael R. Armellino

MRA:lg

Goldman Sach Seminar May 1977
Background dope studies traffic projections

APRIL 20, 1977 • WEDNESDAY
WASHINGTON, D.C.

SPECIAL SUPPLEMENT

PRESIDENT CARTER'S ENERGY MESSAGE
TO CONGRESS
AND
WHITE HOUSE FACT SHEET

"REPRODUCED BY SPECIAL PERMISSION FROM 'DAILY REPORT FOR EXECUTIVES' PUBLISHED BY THE BUREAU OF NATIONAL AFFAIRS, INC."

Published by THE BUREAU OF NATIONAL AFFAIRS, INC., WASHINGTON, D. C. 20037
Right of reproduction and redistribution reserved

THE WHITE HOUSE

ADDRESS BY THE PRESIDENT TO A JOINT SESSION OF CONGRESS ON ENERGY

Mr. President, Mr. Speaker, Members of the Congress, and guests:

The last time we met as a group was exactly three months ago on Inauguration day. We've had a good beginning as partners in addressing our nation's problems.

But in the months ahead, we must work together even more closely, for we have to deal with the greatest domestic challenge our nation will face in our lifetime. We must act now -- together -- to devise and to implement a comprehensive national energy plan to cope with a crisis that otherwise could overwhelm us.

This cannot be an inspirational speech tonight. It is a sober and difficult presentation. During the last three months, I have come to realize very clearly why a comprehensive energy policy has not already been evovled. It is a thankless job, but it is our job, and I believe we have a fair, well balanced and effective plan to present to you. It can lead to an even better life for the people of America.

The heart of our energy problem is that our demand for fuel keeps rising more quickly than our production, and our primary means of sovling this problem is to reduce waste and inefficiency.

Oil and natural gas make up 75 percent of our consumption in this country, but they represent only about 7 percent of our reserves. Our demand for oil has been rising by more than 5 percent each year, but domestic oil production has been falling lately by more than 6 percent. Our imports of oil have risen sharply -- making us more vulnerable if supplies are interrupted -- but early in the 1980's even foreign oil will become increasingly scarce. If it were possible for world demand to continue rising during the 1980's at the present rate of 5% a year, we could use up all the proven reserves of oil in the entire world by the end of the next decade.

Our trade deficits are growing. We imported more than $35 billion worth of oil last year, and we will spend much more than that this year. The time has come to draw the line.

We could continue to ignore this problem -- but to do so would subject our people to an impending catastrophe.

That is why we need a comprehensive national energy policy. Your advice has been an important influence as this plan has taken shape. Many of its proposals will build on your own legislative initiatives.

Two nights ago, I spoke to the American people about the principles behind our plan and our goals for 1985:

-- to reduce the annual growth in rate in our energy demand to less than 2 percent;

-- to reduce gasoline consumption by 10 percent;

-- to cut imports of foreign oil to 6 million barrels a day, less than half the level it would be if we did not conserve;

-- to establish a strategic petroleum reserve of one billion barrels, about a ten months' supply;

-- to increase our coal production by more than two-thirds, to over one billion tons a year;

-- to insulate 90 percent of American homes and all new buildings; and

-- to use solar energy in more than two and a half million homes.

I hope that the Congress will adopt these goals by joint resolution as a demonstration of our mutual commitment to achieve them.

Tonight I want to outline the specific steps by which we can reach those goals. The proposals fall into these central categories:

-- conservation

-- production

-- conversion

-- development, and

-- fairness, which is a primary consideration in all our proposals.

We prefer to reach these goals through voluntary cooperation with a minimum of coercion. In many cases, we propose financial incentives, which will encourage people to save energy and will harness the power of our free economy to meet our needs.

But I must say to you that voluntary compliance will not be enough -- the problem is too large and the time is too short.

In a few cases, penalties and restrictions to reduce waste are essential.

Our first goal is conservation. It is the cheapest, most practical way to meet our energy needs and to reduce our growing dependence on foreign supplies of oil.

With proper planning, economic growth, enhanced job opportunities and a higher quality of life can result even while we eliminate the waste of energy.

Two two areas where we waste most of our energy are transportation and our heating and cooling systems.

Transportation consumes 26 percent of our energy -- and as much as half of that is waste. In Europe the average automobile weighs 2,700 pounds; in our country 4,100 pounds.

The Congress has already adopted fuel efficiency standards, which will require new cars to average 27.5 miles per gallon by 1985 instead of the 18 they average today.

To insure that this existing Congressional mandate is met, I am proposing a graduated excise tax on new gas guzzlers that do not meet federal average mileage standards. The tax will start low and then rise each year until 1985. In 1978, a tax of $180 will be levied on a car getting 15 miles per gallon, and for an 11 mile-per-gallon car the tax will be $450. By 1985 on wasteful new cars with the same low mileage, the taxes will have risen to $1600 and $2500.

All of the money collected by this tax on wasteful automobiles will be returned to consumers, through rebates on cars that are more efficient than the mileage standard. We expect that both efficiency and total automobile production and sales will increase under this proposal. We will insure that American automobile workers and their families do not bear an unfair share of this burden.

Now I want to discuss one of the most controversial and misunderstood parts of the energy proposal -- a standby tax on gasoline. Gasoline consumption represents half of our total oil usage.

We simply must save gasoline, and I believe that the American people can meet this challenge. It is a matter of patriotism and commitment.

Between now and 1980 we expect gasoline consumption to rise slightly above the present level. For the following five years, when we have more efficient automobiles we need to reduce consumption each year to reach our targets for 1985.

I propose that we commit ourselves to these fair, reasonable and necessary goals and at the same time write into law a gasoline tax of an additional 5 cents per gallon that will automatically take effect every year that we fail to meet our annual targets. As an added incentive, if we miss one year but are back on track the next, the additional tax would come off. If the American

Published by THE BUREAU OF NATIONAL AFFAIRS, INC., WASHINGTON, D.C. 20037
Right of reproduction and redistribution reserved

people respond to our challenge, we can meet these targets, and this gasoline tax will never be imposed. I know and you know it can be done.

As with other taxes, we must minimize the adverse effects of our economy -- reward those who conserve -- and penalize those who waste. Therefore, any proceeds from the tax -- if it is triggered -- should be returned to the general public in an equitable manner.

I will also propose a variety of other measures to make our transportation system more efficient. One of the side effects of conserving gasoline is that state governments collect less money through gasoline taxes. To reduce their hardships and to insure adequate highway maintenance, we should compensate states for this loss through the highway trust fund.

The second major area where we can reduce waste is in our homes and buildings. Some buildings waste half the energy used for heating and cooling. From now on, we must make sure that new buildings are as efficient as possible, and that old buildings are equipped -- or "retrofitted" -- with insulation and heating systems that dramatically reduce the use of fuel.

The Federal Government should set an example. I will issue an executive order establishing strict conservation goals for both new and old federal buildings - a 45 percent increase in energy efficiency for new buildings, and a 20 percent increase for existing buildings by 1985.

We also need incentives to help those who own homes and businesses to conserve.

Those who weatherize buildings would be eligible for a tax credit of 25 percent of the first $800 invested in conservation, and 15 percent of the next $1,400.

If homeowners prefer, they may take advantage of a weatherization service which all regulated utility companies will be required to offer. The utilities would arrange for the contractors and provide reasonable financing. The customer would pay for the improvements through small, regular additions to monthly utility bills. In many cases, these additional charges would be almost entirely offset by lower energy consumption brought about by energy savings.

Other proposals for conservation in homes and buildings include:

-- direct federal help for low-income residents;

-- an additional 10 percent tax credit for business investments;

-- federal matching grants to non-profit schools and hospitals;

-- public works money for weatherizing state and local government buildings.

While improving the efficiency of our businesses and homes, we must also make electrical home appliances more efficient. I propose legislation that would, for the first time, impose stringent efficiency standards for household appliances by 1980.

We must also reform our utility rate structure. For many years we have rewarded waste by offering the cheapest rates to the largest users. It is difficult for individual states to make such reforms because of the competition for new industry. The only fair way is to adopt a set of principles to be applied nationwide.

I am therefore proposing legislation which would require the following steps over the next two years:

-- phasing out promotional rates and other pricing systems that make natural gas and electricity artificially cheap for high-volume users and which do not accurately reflect costs.

-- offering users peak-load pricing techniques which set higher charges during the day when demand is great and lower charges when demand is small;

-- individual meters for each apartment in new buildings instead of one master meter.

Plans are already being discussed for the TVA System to act as a model for implementing such new programs to conserve energy.

One final step toward conservation is to encourage industries and utilities to expand "cogeneration" projects, which capture much of the steam that is now wasted in generating electricity. In Germany, 29 percent of total energy comes from cogeneration, but only 4 percent in the United States.

I propose a special 10 percent tax credit for investments in cogeneration.

Along with conservation, our second major strategy is production and rational pricing.

We can never increase our production of oil and natural gas by enough to meet our demand, but we must be sure that our pricing system is sensible, discourages waste and encourages exploration and new production.

One of the principles of our energy policy is that the price of energy should reflect its true replacement cost, as a means of bringing supply and demand into balance over the long-run. Realistic pricing is especially important for our scarcest fuels, oil and natural gas. However, proposals for immediate and total decontrol of domestic oil and natural gas prices would be disastrous for our economy and for working Americans, and would not solve long range problems of dwindling supplies.

The price of newly discovered oil will be allowed to rise, over a three-year period, to the 1977 world market price, with allowances for inflation. The current return to producers for previously discovered oil would remain the same, except for adjustments because of inflation.

Because fairness is an essential strategy of our energy program, we do not want to give producers windfall profits, beyond the incentives they need for exploration and production. But we are misleading ourselves, if we do not recognize the replacement costs of energy in our pricing system.

Therefore, I propose that we phase in a wellhead tax on existing supplies of domestic oil, equal to the difference between the present controlled price of oil and the world price, and return the money collected by this tax to the consumers and workers of America.

We should also end the artificial distortions in natural gas prices in different parts of the country which have caused people in the producing states to pay exorbitant prices, while creating shortages, unemployment and economic stagnation, particularly in the Northeast. We must not permit energy shortages to balkanize our nation.

I want to work with the Congress to give gas producers an adequate incentive for exploration, working carefully toward deregulation of newly discovered natural gas as market conditions permit.

I propose now that the price limit for all new gas sold anywhere in the country be set at the price of the equivalent energy value of domestic crude oil, beginning in 1978. This proposal will apply both to new gas and to expiring intrastate contracts. It would not affect existing contracts.

We must be sure that oil and natural gas are not wasted by industries and utilities that could use coal instead. Our third strategy will be conversion from scarce fuels to coal wherever possible.

Although coal now provides only 18 percent of our energy needs, it makes up 90 percent of our energy reserves. Its production and use create environmental

Goldman Sachs Seminar May 1977
Background dope succeeds traffic projections

difficulties, but we can cope with them through strict strip-mining and clean air standards.

To increase the use of coal by 400 million tons, or 65 percent, in industry and utilities by 1985, I propose a sliding scale tax, starting in 1979, on large industrial users of oil and natural gas. Fertilizer manufacturers and crop dryers which must use gas would be exempt from the tax. Utilities would not be subject to these taxes until 1983, because it will take them longer to convert to coal.

I will also submit proposals for expanded research and development in coal. We need to find better ways to mine it safely and burn it cleanly, and to use it to produce other clean energy sources. We have spent billions on research and development of nuclear power, but very little on coal. Investments here can pay rich dividends.

Even with this conversion effort, we will still face a gap--between the energy we need and the energy we can produce and import. Therefore, as a last resort we must continue to use increasing amounts of nuclear energy.

We now have 63 nuclear power plants, producing about 3 percent of our total energy and about 70 more are licensed for construction. Domestic uranium supplies can support this number of plants for another 75 years. Effective conservation efforts can minimize the shift toward nuclear power. There is no need to enter the plutonium age by licensing or building a fast breeder reactor such as the proposed demonstration plant at Clinch River.

We must, however, increase our capacity to produce enriched uranium for light water nuclear power plants, using the new centrifuge technology, which consumes only about 1/10th the energy of existing gaseous diffusion plants.

We must also reform the nuclear licensing procedures. New plants should not be located near earthquake fault zones or near population centers, safety standards should be strengthened and enforced, designs standardized as much as possible, and more adequate storage for spent fuel assured.

However, even with the most thorough safeguards, it should not take ten years to license a plant. I propose that we establish reasonable, objective criteria for licensing, and that plants which are based on a standard design not require extensive individual design studies for licensing.

Our fourth strategy is to develop permanent and reliable new energy sources.

The most promising is solar energy, for which much of the technology is already available. Solar water heaters and space heaters are ready for commercialization. All they need is some incentive to initiate the growth of a large market.

Therefore, I am proposing a gradually decreasing tax credit, to run from now through 1984, for those who purchase approved solar heating equipment. Initially, it would be 40 percent of the first $1,000 and 25 percent of the next $6,400 invested.

Increased production of geothermal energy can be insured by providing the same tax incentives as for gas and oil drilling operations.

Our guiding principle, as we developed this plan, was that above all it must be fair.

None of our people must make an unfair sacrifice. None should reap an unfair benefit.

The desire for equity is reflected throughout our plan:

-- in the wellhead tax, which encourages conservation but is returned to the public;

-- in a dollar-for-dollar refund of the wellhead tax as it affects home heating oil;

-- in ensuring that homes will have the oil and natural gas they need, while industry turns toward the more abundant coal that can also suit its needs;

-- in basing utility prices on true cost, so every user pays a fair share;

-- in the automobile tax and rebate system, which rewards those who save our energy and penalizes those who waste it.

I propose one other step to insure proper balance in our plan. We need more accurate information about our supplies of energy, and about the companies that produce it.

If we are asking sacrifices of ourselves, we need facts we can count on. We need an independent information system that will give us reliable data about energy reserves and production, emergency capabilities and financial data from the energy producers.

I happen to believe in competition, and we don't have enough of it.

During this time of increasing scarcity, competition among energy producers and distributors must be guaranteed. I recommend that individual accounting be required from energy companies for production, refining, distribution and marketing -- separately for domestic and foreign operations. Strict enforcement of the anti-trust laws can be based on this data, and may prevent the need for divestiture.

Profiteering through tax shelters should be prevented, and independent drillers should have the same intangible tax credits as the major corporations.

The energy industry should not reap large unearned profits. Increasing prices on existing inventories of oil should not result in windfall gains but should be captured for the people of our country.

We must make it clear to everyone that our people, through their government, will now be setting our energy policy.

The new Department of Energy should be established without delay. Continued fragmentation of government authority and responsibility for our nation's energy program is dangerous and unnecessary.

Two nights ago, I said that this difficult effort would be the moral equivalent of war. If successful, this effort will protect our jobs, our environment, our national independent, our standard of living, and our future. Our energy policy will be innovative, but fair and predictable. It will not be easy. It will demand the best of us -- our vision, our dedication, our courage, and our sense of common purpose.

This is a carefully balanced program, depending for its fairness on all its major component parts. It will be a test of our basic political strength and ability.

But we have met challenges before, and our nation has been the stronger for it. That is the responsibility that we face -- you in the Congress, the members of my administration, and all the people of our country. I am confident that together we will succeed.

* * *

Goldman Sach Seminar May 1977
Background dope-Success traffic projections

THE WHITE HOUSE

DETAILED FACT SHEET

THE PRESIDENT'S ENERGY PROGRAM

The President tonight addressed a Joint Session of Congress and presented the outline of a national energy plan to be submitted to the Congress next week.

I. NATIONAL ENERGY POLICY PRINCIPLES, STRATEGIES AND GOALS

A. PRINCIPLES

The National Energy Plan is based on ten fundamental principles.

1. We can have an effective and comprehensive energy policy only if the Government takes responsibility for it and if the people understand the seriousness of the challenge and are willing to make sacrifices.

2. Healthy economic growth must continue. Only by saving energy can we maintain our standard of living and keep our people working.

3. We must protect the environment. Our energy problems have the same cause as our environmental problems -- wasteful use of resources. Conservation helps us solve both at once.

4. We must reduce our vulnerability to potentially devastating embargoes. We can protect ourselves from uncertain supplies by reducing our demand for oil, making the most of our abundant resources such as coal, and developing a strategic petroleum reserve.

5. We must be fair. Our solutions must ask equal sacrifices from every region, every class of people, every interest group. Industry will have to do its part to conserve, just as consumers will. The energy producers deserve fair treatment, but we will not let the energy companies profiteer.

6. The cornerstone of our policy is to reduce demand through conservation. Our emphasis on conservation is a clear difference between this plan and others which merely encouraged crash production efforts. Conservation is the quickest, cheapest, most practical source of energy.

7. Prices should generally reflect the true replacement cost of energy. We are only cheating ourselves if we make energy artificially cheap and use more than we can really afford.

8. Government policies must be predicatable and certain. Both consumers and producers need policies they can depend on so they can plan ahead.

9. We must conserve the fuels that are scarcest and make the most of those that are more plentiful. We cannot continue to use oil and gas for 75 percent of our consumption when they make up only 8 percent of our domestic reserves. We need to shift to plentiful coal while taking care to protect the environment, and to apply stricter safety standards to nuclear energy.

10. We must start now to develop the new, unconventional sources of energy we will rely on in the next century.

B. STRATEGY

1. The objectives of the National Energy Plan are:

a. In the short term, to reduce dependence on foreign oil and to limit supply disruptions.

b. In the medium term, to weather the eventual decline in the availability of world oil supplies caused by capacity limitations.

c. In the long term, to develop renewable and essentially inexhaustible sources of energy for sustained economic growth.

2. The major strategies for reaching these objectives are:

a. Implementation of an effective conservation program for all sectors of energy use so as to reduce the rate of demand growth to less than 2 percent, thereby helping to achieve both the short and medium term goals.

b. The conversion of industry and utilities using oil and natural gas to coal and other more abundant fuels to reduce imports and make natural gas more widely available for household use, thereby helping to achieve both the short and medium term goals.

c. A vigorous research and development program to provide renewable and essentially inexhaustible resources to meet United States energy needs in the next century, thereby helping to achieve the long term goal.

C. NATIONAL ENERGY GOALS

A national energy plan is not something that can be adopted and then foregotten. There is no quick or easy solution to the energy problem.

The President will propose as part of his comprehensive energy legislation the following energy goals to be achieved between now and 1985. The Congress will be requested to support these goals by enacting a Joint Resolution of the Senate and House committing the Nation to:

-- reducing annual growth of United States energy demand to less than two percent;

-- reducing oil imports from a potential level of 16 million barrels a day to less than 6 million barrels, about one-eighth of total energy consumption;

-- achieving a 10 percent reduction in gasoline consumption;

-- insulating 90 percent of all residences and other buildings;

-- increasing coal production on an annual basis by at least 400 million tons;

-- using solar energy in more than two and a half million homes.

II. EFFECTS OF THE PRESIDENT'S ENERGY PLAN

The President's energy plan, if implemented effectively, is projected to save about 4.6 million barrels of oil per day (MMB/D) of oil over the amount oil we would otherwise require by 1985. These savings would reduce oil imports to about 7 MMB/D by 1985, a 40 percent decrease. The President has established a goal of reducing imports to below 6 MMB/D, which would require voluntary conservation efforts by the American public.

Based on econometric projections, the President's program is forecasted to have small, but generally positive impacts on the economy. The program would stimulate about 100,000 jobs by 1985. It would increase GNP by 0.7 percent in 1978 and about 0.4 percent in 1985. It would increase the GNP deflator by about 0.4 percent annually through 1985. Even if the standby gas tax were triggered, GNP would still increase and the inflation impact would still be small.

III. THE PRESIDENT'S ENERGY PROGRAM

The elements of the total program are summarized in the pages that follow.

A. CONSERVATION

1. Transportation

a. Gas guzzler tax and rebate (legislative):

Because present law and regulations are insufficient to assure that needed conservation will take place in this sector, a graduated excise tax would be imposed

Published by THE BUREAU OF NATIONAL AFFAIRS, INC., WASHINGTON, D.C. 20037
Right of reproduction and redistribution reserved

on new automobiles and light duty trucks whose fuel economy fails to meet the applicable fuel economy standard under existing law. Graduated rebates would be given for automobiles and light duty trucks whose fuel economy is better than the standard.

The tax schedule would be fixed by statute, and taxes would begin in model year 1978, increase each year through 1985, and remain constant thereafter. The rebate schedule will be adjusted each year in advance, by the IRS, so that total estimated rebate payments will not exceed the estimated tax receipts. The proposed tax and rebate table is attached as Appendix A.

Electric vehicles will be eligible for the maximum rebate. Rebates will be available for vehicles manufactured in the United States and Canada. Rebates would be available for vehicles manufactured in other countries on the basis of treaties or executive agreements entered into between these countries and the United States. The President's Special Representative for Trade Negotiations will work with other nations to develop equitable rebate agreements.

b. Auto efficiency standards (administrative): In order to continue the progress made to date on automobile fuel efficiency, the Secretary of Transportation will begin the analysis necessary to exercise his authority to raise mileage standards above 27.5 mpg after 1985.

c. 55 mph speed limit (administrative): The President has requested that the national 55 mph speed limit be vigorously enforced by States and municipalities. The Secretary of Transportation may, if he finds it necessary, withhold highway trust fund revenues from States not enforcing the limit.

d. Standby gasoline tax (legislative): A standby gasoline tax is proposed to go into effect if targets for gasoline consumption are not met. The targets take into account the effects of the gas-guzzler tax and compliance with mandatory fuel economy standards for new cars, and assume some additional reduction in consumption through such items as observing speed limits and more carpooling.

The goals, listed below:

Permit limited increases in gasoline consumption until 1980; from 1980 to 1987, the goal constitutes an achievable reduction in gasoline consumption despite increases in total miles travelled.

If gasoline consumption nationwide in 1978 exceeds the target set for 1978 by one percent or more, a 5 cents per gallon tax will be imposed on January 15, 1979. In any subsequent year, the tax will amount to 5 cents per gallon for each percent that consumption in the prior year exceeded the target, except that the tax could not be increased or reduced more than 5 cents per year. The tax will rise, remain the same, or fall, depending on the prior year's record. The cumulative amount of taxes applicable in any one year may not exceed 50 cents per gallon.

Any funds collected would be rebated to the American people progressively through the Federal income tax system and by direct payments to people who do not pay taxes.

e. Expand use of Highway Trust Fund: by reducing gasoline consumption, State revenues from gasoline taxes would also be reduced. These funds are used by the States for repair and maintenance of highways. The Administration will develop a program which will reduce their hardships and, to insure adequate highway maintenance, will compensate them for this loss through sources such as the Highway Trust Fund.

f. Efficiency standards for light duty trucks (administrative): The Secretary of Transportation is authorized under the Energy Policy and Conservation Act to promulgate efficiency standards for trucks weigh 10,000 pounds or less. He is currently in the proc of promulgating standards for trucks weighing 6,000 pounds or less. The President has directed the Secretary to commence a proceeding to cover trucks weighing more than 6,000 pounds.

g. Removal of 10 percent excise tax on intercity buses (legislative): Since buses, like railroads, are fuel-efficient forms of transportation, the current 10 percent excise tax on intercity buses would be removed to encourage expansion in use of this form of transportation.

h. Tax on aviation and marine fuel (legislative): The existing Federal excise tax preferences for general aviation and motorboat fuel would be eliminated. This change would not effect commercial airlines or commercial fishermen. The tax on aviation fuel would increase from 7 to 11 cents a gallon. The current 2 cents rebate for motorboat fuel would be collected and transferred to the Land and Water Conservation Fund.

i. Federal Energy Management Program

-- The President will direct Federal agencies to alter their auto purchasing practices so that new cars purchased by the Government will, on the average, exceed the average fuel economy standard under the EPCA by at least 2 mpg in 1978, and by at least 4 mpg in 1980 and thereafter (administrative).

-- Legislation will be proposed to initiate a Federal vanpooling program. This program will demonstrate the energy conservation and pollution con l potential of this form of commuter transportatic y the largest employer in the Nation. About 6,000 vans will be purchased by the Government and made available for use by Federal employees. All costs of the program will be repaid to the Federal Government by the riders (legislative).

2. Buildings

a. National Residential Energy Conservation Program for Existing Buildings

-- Homeowners will be entitled to a tax credit of 25 percent of the first $800 and 15 percent of the next $1400 spent on approved conservation measures. The credits will be available for measures undertaken between April 20, 1977, and December 31, 1984 (legislative).

-- State Public Utility Commissions will be - required to direct utilities to offer their customers a residential energy conservation service performed by the utility and financed by loans repaid through monthly utility bills. The utilities must also inform customers of other available residential conservation programs and how to obtain financing, materials and labor to perform residential conservation themselves. Other fuel suppliers would be encouraged to offer similar programs, with the help of their State Energy Offices (legislative).

-- The Federal Government will remove the barriers to opening a secondary market for residential energy conservation loans through the Federal Home Loan Mortgage Corporation and the Federal National Mortgage Association. This action sh help to ensure that capital is available to homeo ers at reasonable interest rates for residential energy conservation through private lending institutions (legislative).

-- Funding for the existing low-income residential conservation program (weatherization) will be increased

Goldman Sachs Seminar May 1977
Background depressed traffic projections

to $130 million in fiscal year 1978; and $200 million in FY 1979 and in FY 1980 (budget).

-- The Secretary of Labor will take all appropriate steps to ensure that recipients of funds under the Comprehensive Employment and Training Act (CETA) will supply labor for the residential conservation program. The CETA program's employment levels, as proposed by the Administration, would meet the labor requirements of the program (administrative/budget).

-- The Secretary of Agriculture will vigorously implement a rural home weatherization program in cooperation with the Nation's 1,000 Rural Electric Cooperatives, with loans provided through the Farmer's Home Administration (administrative).

-- Businesses will be entitled to a 10 percent tax credit, in addition to the existing investment tax credit, for investments made in approved conservation measures (legislative).

- A Federal grants program will assist public and non-profit schools and hospitals in installing conservation measures, funded at the rate of $300 million per year for three years (legislative/budget).
- The Secretary of Commerce will encourage State and local governments to include items that will contribute to energy conservation in their proposals under the Department's Local Public Works program (administrative).

Except for participation by electric and gas utilities, the residential energy conservation program is voluntary. However, if the programs described above are insufficient in achieving widespread residential energy conservation, then mandatory measures will be considered; e.g., a requirement that homes must be insulated before they are sold.

b. Mandatory efficiency standards for new buildings (administrative/budget):

The Secretary of Housing and Urban Development will advance by one year, from 1981 to 1980, the effective date of the mondatory standards required for new residential and commercial buildings by the Energy Conservation and Production Act, with funds to be made available to States to help them in this effort.

c. Federal buildings (administrative/budget):

The President will direct all Federal agencies to adopt procedures which aim at reducing energy use per square foot by 1985 by 20 percent from 1975 energy consumption levels for existing Federal buildings and by 45 percent for new Federal buildings. Investments which are not cost-effective would not be funded under the program. The Director of the Office of Management and Budget and the Administrator of the Federal Energy Administration will implement this program.

d. Solar energy in Federal buildings (legislative/budget):

The Federal Government will, in addition, spend up to $100 million over the next three years to add solar hot water and space heating to suitable Federal structures to help demonstrate the commercial potential of such measures.

3. Appliances (legislative):

-- The present appliance efficiency program will be strengthened. Voluntary targets will be replaced by mandatory standards on certain home appliances, such as air conditioners, furnaces, water heaters and refrigerators, as soon as possible. The program under existing law to develop test procedures and to establish labeling requirements for appliances will be continued.

4. Industrial Conservation (legislative):

-- Legislation will be proposed for a five-year, 10 percent investment tax credit for investment in approved energy-saving industrial equipment, including solar energy equipment, that could be incorporated in existing plants. This credit would be in addition to the present 10 percent tax credit.

5. Cogeneration of Electricity and Process Steam (legislative):

-- In order to utilize effectively the enormous quantities of heat wasted in the production of electric power, legislation will be submitted to encourage cogeneration -- production of electric power and other useful forms of energy (such as heat or process steam) from the same facility.

-- An exemption from Federal and State public utility regulations would be available to industrial cogenerators.

-- The Federal Power Commission would be required to establish procedures to assure fair rates for both sale of power by cogenerators and for purchase of back-up power.

-- Industries using cogeneration would be entitled to intertie with utility transmission facilities to sell surplus power and buy back-up power at fair prices.

-- A tax credit of 10 percent, in addition to the current 10 percent tax credit, would be provided for the purchase of cogeneration equipment. Those industries which invest in equipment could be exempted from the requirement to convert from oil and gas in cases where an exemption is necessary to stimulate cogeneration.

6. District Heating (administrative/budget):

-- State public utility commissions will be encouraged to use district heating as a criterion in siting certification and ratemaking for new generating facilities.

-- The Administrator of the Energy Research and Development Administration will initiate in FY 1978 a new demonstration program to make use of waste heat generated by ERDA's uranium enrichment plants at Oak Ridge, Tennessee, Paducah, Kentucky, and Portsmouth, Ohio. The recovered waste heat would be used on site and nearby households, industry and farms.

7. Utility Rate Reform (legislative):

-- Conventional utility pricing policies discourage conservation. The smallest users commonly pay the highest per unit price due to practices such as declining block rates. Rates often do not reflect the costs imposed on society by the actions of utility consumers. The result is waste and inequity. The President will therefore submit legislation which contains the following provisions:

-- State Public Utility Commissions must require their regulated electric utilities to phase out and eliminate promotional, declining, and other rates for electricity that do not reflect cost incidence.

-- To shift energy use from peak to non-peak periods, electric utilities would be required to offer daily off-peak rates to each customer who is willing to pay metering costs and to offer lower rates to customers willing to have their power interrupted at times of highest peak demand.

Right of reproduction and redistribution reserved

-- Master metering for electricity would generally be prohibited in new structures.

-- State Public Utility Commissions would require gas utilities to eliminate declining block rates and to implement such rules as FPC may prescribe with respect to master metering, summer-winter rate differentials, and interruptible rates.

-- By amendment to the Federal Power Act, the Federal Power Commission would be authorized to require interconnection and power pooling between utilities even if they are not presently under FPC jurisdiction, and to require "wheeling" (the transmission of power between two non-contiguous utilities across a third utility's system).

8. Taxes on Oil and Natural Gas

-- The oil and natural gas pricing and tax policy discussed in Part F, will achieve substantial savings in natural gas and petroleum consumption. The oil and gas consumption taxes are directed primarily at industrial and utility use, and will encourage investments by industry to use these scarce fuels more efficiently.

B. MANAGEMENT INFORMATION SYSTEMS

-- To carry out the President's energy plan and to protect the energy consuming public generally, the Government needs more detailed and reliable information on oil and gas reserves, on oil company operations, and on local energy supplies and demand.

-- Accordingly, a three-part energy information program will be proposed. They represent the beginning of implementation of a National Energy Information System which will, when fully developed, provide a comprehensive and authoritative source of energy information.

1. Petroleum Production and Reserves Information System (administrative/budget): The proposed Department of Energy, upon its creation, would take over the audit and verification roles now performed by the American Gas Association and the American Petroleum Institute. These industry associations and their member companies would be required to open their reserve estimation process to Federal officials, who would supervise the collection and preparation of reserve data. Information collected and submitted through this system would be randomly audited at the company level. Existing law regarding the protection of confidential, proprietary information would not be changed. This system will consolidate the reserves information gathering activities of Government agencies, where possible, and will eliminate redundant reporting which now occurs among the various agencies.

2. Petroleum Company Financial Data System (administrative/budget): This system would require all large companies, and a sample of small firms, engaged in crude oil or natural gas production to submit detailed financial information to the Federal Government. Companies would have to conform, ultimately, to a uniform system of accounts, and to report capital expenditures and operating results by geographic region and type of fuel. They would be required to submit information relating to functional areas, including refining, production, marketing and pipelines, and information relating to foreign as well as domestic operations. This comprehensive reporting system would enable the government to assess the performance of individual firms and the industry, as a whole, providing accountability of vertical operations of the integrated companies. Existing law regarding the protection of confidential, proprietary information would not be changed.

3. Emergency Management Information System (administrative/budget): This system would provide Government with the information on local energy supplies and demand needed to respond to an oil embargo, a natural gas shortage, or other energy emergency. Examples of potential future shortages include possible electrical power shortages in the West this coming summer and natural gas shortages in future winters. State Energy Offices, assisted by the Federal government, would collect and maintain the data.

C. INDUSTRY COMPETITION

-- Promotion and maintenance of competition is a critical aspect of public policy. Since energy is an essential commodity for all Americans, effective competition in the energy industries is a matter of vital concern. The President's energy plan calls for continuous vigilance to ensure that the structure, behavior and performance of the energy industries are vigorously competitive.

-- The Under Secretary for Policy and Evaluation within the proposed Department of Energy would have prime responsibility to ensure that all policies and programs of the Department promote competition. The Department of Energy would seek to preserve the competitive viability of independents in all segments of the energy industry.

-- In recent years, trends and practices in the energy industries have created substantial public concern. Attention has focused particularly on the oil and natural gas industry, but also on situations in other energy industries, such as coal and uranium, join ventures, and the international activities of the major multinational firms.

-- Horizontal diversification by oil and gas producers, particularly into the coal industry has aroused fears that the major firms will be able to restrict the development of alternative fuel sources. The existence of such power could be very detrimental to the Nation as it increases its reliance of coal, uranium, and renewable energy sources. The trend of oil and gas company entry into coal mining merit continuous close attention.

-- From information available at the present time, it does not appear that new laws mandating either vertical or horizontal divestiture are required in order to promote or maintain competition in the energy industries. That conclusion is subject to change. If it should appear that there are anti-competitive problems in the energy industries that cannot be reached under current laws, new legislation would be proposed.

D. STATE AND LOCAL GOVERNMENT PARTICIPATION

-- A National Energy Plan can be built only on a foundation of partnership and understanding among the Federal Government, the States, local governments, and the Nation's Indian tribes, which own a substantial part of the Nation's energy resources.

-- The President is committed to ensuring that no State, local community or Indian tribe suffers as a result of energy development. In order to assess the adequacy of existing impact assistance programs and make certain that there are no gaps, he has ordered that his Assistant for energy and the Director of OMB undertake a careful review of such programs. If gaps are found to exist in coverage, legislation to remedy those problems will be proposed.

E. ASSISTANCE FOR LOW INCOME PERSONS

-- Government at all levels has the responsibility for protecting low income citizens from the most severe effects of the energy crisis. The Plan contains several programs to carry out the responsibility.

-- The weatherization program, by insulating large numbers of low income homes, would protect low income people not only from the cold, but also from rising fuel bills. The rebate system for the wellhead tax on oil and the standby gasoline tax would distribute funds to low income persons in a progressive manner. The price controls on natural gas and the allocation of high cost sources to industry will protect low-income consumers whose homes are heated with natural gas. The price controls on oil and the rebate system to exempt home heating oil from the impact of taxes on oil will protect low-income consumers whose homes are heated with oil. For the longer-run, protection for low-income people from the gradually increasing cost of energy, lies in a reformed welfare system on which the Administration is at work.

-- The remaining major problem is the possibility that the Nation will experience future supply disruptions, such as the natural gas shortage last winter or another oil embargo. Such events could cause temporary, but sharp increases in the cost of basic energy in some regions, or to users of particular fuels. Such increases are particularly harmful to low income people, who have little or no discretionary income with which to meet energy price rises. Present programs have deficiencies in meeting these emergency needs. The President has, therefore, directed the Secretary of Health, Education and Welfare to complete work on a revised emergency assistance program for prompt submission to the Congress.

F. OIL AND NATURAL GAS

-- Oil and natural gas account for three-quarters of the Nation's energy needs, yet constitute less than 8 percent of current domestic energy reserves. These fuels are priced domestically below their marginal replacement costs, as a result, the Nation uses them wastefully with little regard to their true value.

-- The Federal Government must provide for prices that provide adequate incentives for producers while preventing industry from receiving windfall profits. Price controls will protect consumers from profiteering by producers, while taxes on utility and industrial use of oil and gas will encourage conservation and conversion to coal. The residential sector is sheltered as the Plan would keep natural gas prices to residential users down and provide tax rebates for home oil use.

1. Oil Pricing (legislative): The President is committed to the retention of domestic oil price controls for the foreseeable future to prevent windfall profits for oil producers who would otherwise be able to charge the OPEC determined world price of oil. The basic mechanism adopted by the Energy Policy and Conservation Act would be revised and extended to create a new long-range oil pricing system which would:

-- continue indefinitely the current price ceilings of $5.25 and $11.28 per barrel for previously discovered oil, subject only to escalation at the general rate of inflation.

-- allow newly discovered oil to rise over a three year period to the current world price (adjusted for the rate of inflation); thereafter, newly discovered oil would continue to be priced at the 1977 world price with adjustments for a domestic increases in the general rate of inflation

-- define newly discovered oil as oil from a well drilled more than 2 1/2 miles from an existing onshore well as of April 20, 1977, or more than 1,000 feet deeper than any well within any 2 1/2 mile radius. New oil offshore will be limited to oil from lands leased after April 20, 1977

-- any price increases for any tier in excess of the increases in the general rate of inflation recommended by the Executive Branch would be subject to Congressional disapproval before becoming effective

-- incremental tertiary recovery from old fields and stripper oil would be free of price controls

2. Oil Taxes (legislative): All domestic oil would become subject to a crude oil equalization tax applied in three equal stages beginning on January 1, 1978. When fully phased in, the tax per barrel would equal the difference between the controlled domestic price and the world price. The second tax installment in 1979 would bring all domestic crude prices up to the $11.28 tier and the third increment would bring it to the world price in 1980. Once the tax is fully in place, it would rise with world oil prices, except that authority would exist to discontinue an increase if the world price increased significantly faster than the general level of inflation. The net funds collected as a result of this tax would be returned to the public, on a per capita basis, in the form of tax credits or direct payments for those who have no tax liability.

The oil tax would provide no net gain to the Treasury, and no net loss to consumers as a group, while establishing a more realistic energy pricing system. Once the tax is fully in effect, all domestic oil would have approximately the same price (after tax) as the world price, the entitlements program would be terminated, and certain related regulatory activities could be phased out.

3. Natural Gas Pricing (legislative): Current Pricing policy evolved at a time when gas was a surplus byproduct of oil. As a result it is now the Nation's most underpriced and oversold fuel. By helping bring natural gas supply and demand back into balance, this pricing proposal is an important first step toward deregulation. If the oil and gas pricing and taxing initiatives in this Plan succeed, it may be possible to return to a market determined price for new natural gas.

The new gas pricing policy provides prices for new gas that will reflect future costs and risks associated with finding new supplies, recognizes that the United States constitutes a single market for natural gas, and continues controls on old gas.

Specifically, this proposal would:

-- subject all new gas, sold anywhere in United States, to a price limitation of the BTU equivalent of the average refiner acquisition cost (before tax) of all domestic crude oil. That price limitation would be approximately $1.75 per Mcf at the beginning of 1978; the interstate-intrastate distinction would disappear for new gas

-- define new natural gas using the same standards as are used to define newly discovered oil (2 1/2 miles, 1,000 feet, new leases)

-- guarantee price certainty at current levels for currently flowing gas, with adjustments to reflect inflation

-- authorize the establishment of higher incentive pricing levels for specific categories of high cost gas

-- allow gas made available at the expiration of existing interstate contracts or by production from existing reservoirs in excess of contracted volumes to qualify for a price no higher than the current $1.42 Mcf ceiling adjusted for inflation; gas made available under the same circumstances from existing intrastate production would qualify for the same price as new gas; i.e., $1.75 per Mcf at the beginning of 1978.

-- allocate the cost of the more expensive new gas to industrial users, not to residential and commercial users

-- extend Federal jurisdiction to SNG facilities guaranteeing them a reasonable rate of return

Right of reproduction and redistribution reserved

Goldman Sach Seminar May 1977
Background docs - success traffic projections

This pricing mechanism would not affect the existing intrastate contracts. Because the Nation will remain vulnerable to natural gas supply emergencies during the coldest months of the year, the President will propose the emergency gas allocation authority be extended for three years.

4. Other Oil and Gas Measures

a. Alaskan crude pricing (legislative): Inclusion of North Slope oil in the domestic composite price under the current provisions in EPCA would introduce a degree of unnecessary uncertainty into domestic crude oil pricing. This is because of the large volume of new Alaskan oil that would initially be moving into the composite average at a wellhead price anticipated to be considerably below the current average. Under the proposed amendments and extension of EPCA, this problem would be eliminated. The $5.25, $11.28 and new oil pricing tiers, adjusted for inflation, would be substituted for the composite average limitation. Alaskan oil would be subject to an $11.28 wellhead ceiling price, but would be treated as foreign oil for purposes of the entitlements program.. New Alaskan oil finds would be subject to the new oil wellhead price.

b. Elk Hills production (legislative): Legislation will be sought to limit production from Elk Hills Naval Petroleum Reserve to a ready reserve level at least until the West-to-East transportation systems for moving the Alaskan oil surplus are in place and until California refiners have completed a major refinery retrofit program to enable more Alaskan oil to be used in California.

c. Shale Oil (administrative): Because of the high risks and costs involved in shale oil development, shale oil will be entitled to receive the world price of oil in the United States.

d. Oil Stockpile (administrative/budget): We plan to expand the Strategic Petroleum Reserve to one billion barrels from the currently projected 500,000,000 barrels. Such a reserve would enable the United States to withstand a serious supply interruption for 10 months. In addition, rationing and conservation contingency plans will be submitted to the Congress for its review. The FEA will undertake an analysis of additional contingency plans which would be placed into effect during a severe supply interruption.

e. Liquified Natural Gas (LNG) (administrative): The limitation on the importation of LNG imposed by the previous Administration is being replaced by a more flexible policy that will provide for a case-by-case analysis of each project. Strict siting criteria would foreclose the location of future tanker docks in densely populated areas.

f. Synthetic natural gas (SNG) (administrative): Current policy discourages construction of SNG facilities. A Federal task force will be established to identify areas where additional SNG plants should be built. The FEA will ensure that plants built in those areas will receive priority for SNG feedstocks.

g. Gas development (administrative): Federal research and development programs on gas from geopressurized zones will be greatly accelerated. Efforts to develop gas from Devonian shale will also be expanded.

h. Outer Continental Shelf (administrative): The Congress is now considering amendments to the OCS Lands Act which would provide additional authorities to ensure that OCS development is consistent with national energy policies, particularly by providing for a flexible leasing program using bidding systems that enhance competition, assure a fair return to the public, and promote full development of OCS resources. The Administration supports these amendments.

i. Gasoline Decontrol (administrative): Gasoline prices have never reached their allowable controlled ceilings, and marketers have contended for some time that deregulation of gasoline would increase competition by allowing them to shop among suppliers.

In order to assure the maintenance of such competition, the Administration will support legislation similar in concept to the current "Dealer Day in Court" statute that protects service station dealers from arbitrary cancellation of their leases by major oil suppliers.

In addition, the Administration currently hopes to eliminate gasoline price controls and allocation regulations at the end of the peak driving season this coming fall. Gasoline prices and market competition will be closely monitored and controls will be reimposed if prices rise above a predetermined trigger level. If this action is taken, it would permit the elimination of controls while protecting consumers.

j. Tax Change (legislative): A competitive problem has resulted from an effect of the Tax Reform Act of 1976, which changed the tax treatment of intangible drilling costs. Some independent oil and gas producers have been deprived of a portion of the tax reduction for such expenses, while the major corporate producers continue to enjoy the full deduction. This anomaly should be removed. As part of the President's program for extending oil and gas price controls, the Administration would urge that independent oil and gas producers receiv the same tax treatment of intangible drilling costs as their corporate competitors, the major oil companies. Investors who finance oil and exploration in order to obtain a tax shelter for income earned in other occupations should not, however, receive such a benefit.

G. COAL, NUCLEAR AND HYDROELECTRIC POWER

-- Even with vigorous conservation, America's demand for energy will continue to grow for the next decade. Although the United States will eventually make extensive use of solar and other non-conventional energy sources, it will have to rely, for at least the next two decades, on the conventional sources now at hand: oil, natural gas, coal, nuclear power, and hydroelectric power.

1. Oil and Natural Gas Users Tax (legislative): In order to stimulate the shift away from oil and gas toward coal and the conservation of oil and gas used by utilities and industry legislation will be submitted which would do the following:

-- Beginning in 1979, each industrial user of natural gas (except fertilizer manufacturers and certain agriculture users) would be taxed an amount equal to the difference between his average cost of natural gas and a price target keyed to current price of distillate oil. The target level for the first year's tax in 1979 would be $1.05 below the Btu equivalent price of distillate. The target price would rise to equal the distillate price in 1985 and beyond. Thus, in 1979, an industrial user who paid $1.65 per Mcf would pay a tax of $ .30 per Mcf to bring the total cost of gas up to the target level of $1.95 per Mcf, assuming the BTU equivalent of distillate is $3.00. By 1985, the target level would rise to approximately

Right of reproduction and redistribution reserved

Goldman Sach Seminar May 1977
Background dope-success traffic projections

$3.30 per Mcf, resulting in an average tax of $1.10 per Mcf based on a projected actual gas cost of $2.20 per Mcf.

-- Utility users of natural gas would be similarly taxed, starting in 1983 at an amount that would bring the cost of gas to them to a level of $ .50 per Mcf below the BTU equivalent price of distillate. The tax would rise so that by 1988 the cost of gas to them would equal the cost of an equivalent amount of distillate. The later starting date for the tax on utility use of natural gas reflects the longer lead time required by utilities to convert to coal.

-- Industrial and utility users of petroleum would be taxed at a flat rate since, unlike natural gas prices, petroleum prices are relatively uniform nationwide. Beginning in 1979, industrial use would be taxed $ .90 per barrel; the tax would rise to $3.00 per barrel by 1985. A tax on utility use of petroleum would begin in 1983 at $1.50 per barrel and remain at that level thereafter.

-- Industry would be eligible for either an additional 10 percent investment tax credit for conversion expenditures or a rebate of any natural gas or petroleum taxes paid, up to the amount of any expenditures incurred for conversion to coal or other fuels. The rebate in any year could not exceed the amount of taxes paid. However, there would be a carry-forward provision for conversion expenditures that exceeded the tax payments.

-- Oil and gas taxes collected from utilities would be set aside to help utilities accelerate the retirement of their oil and gas burning capacity.

With tax liability delayed until 1979 for industry and 1983 for utilities, prudent investors undertaking an aggressive conversion program should be able to accumulate enough conversion credits to eliminate, or minimize, the actual amounts of tax collected. As a practical matter, only those industrial firms and utilities which lagged behind in conversion would be subject to the tax.

2. Coal Conversion Regulatory Policy (legislative)

In order to assure the greatest possible conversion of utilities and industrial installations to coal and other fuels, while ensuring compliance with applicable environmental standards, legislation will be submitted to:

-- prohibit industry and utilities from burning natural gas or petroleum in new boilers with only limited environmental and economic exceptions; industry could also be prohibited from burning gas or petroleum in facilities other than boilers, by regulations applicable to types of installations, or on a case-by-case basis

-- prohibit existing facilities with coal-burning capability from burning gas or oil, by regulations applicable to categories or on a case-by-case basis; with limited temporary exceptions, no utility will be permitted to burn natural gas after 1990

-- require facilities burning coal to obtain approval to shift to petroleum or natural gas;

-- require utilities burning natural gas to obtain a permit to shift to petroleum

-- allow any industrial firm or utility, prohibited from using natural gas, to sell its contract to purchase gas at a price that would provide adequate compensation.

3. Environmental Policy for Coal

-- The Administration supports a strong, but consistent and certain, environmental policy to protect the environment and provide the confidence industry requires to make investments in energy facilities. That policy would:

-- require the installation of the best available control technology in all new coal-fired plants, including those that burn low sulfur coal

-- protect areas where the air is still clean from significant deterioration;

-- encourage States to classify lands to protect against significant deterioration within three years after enactment of Clean Air Act Amendments

-- require Governors to announce intent to change the classification of the allowable air quality for a given area within 120 days after an application is made to construct a new source in that area

-- require States to approve or disapprove the application within one year thereafter

-- The President believes that further study is needed with regard to the Environmental Protection Agency's current policies allowing offsetting pollution tradeoffs for new installations and therefore requests that Congress not write into law a definitive formula for a nonattainment policy until this analysis is completed.

-- The President will appoint a special committee to study the health effects of increased coal production and use, and the environmental constraints on coal mining and on the construction of new coal-burning facilities. The Committee will report to the President by October, 1977 (administrative).

-- The President will request almost $3 million to study the long-term effects of carbon dioxide from coal and other hydrocarbons on the atmosphere (budget).

-- The President reiterated his support for tough, uniform national strip mine legislation.

4. Coal Research and Development (budget)

-- The President has directed ERDA, EPA and the Department of the Interior to undertake a major expansion of the Government' coal research and development program. The program will focus primarily on meeting environmental requirements more effectively and economically, and will seek to expand the substitution of coal for gas and petroleum products.

-- The program will include research on

-- more effective, economical methods to meet air pollution control standards, including flue gas desulfurization systems ("scribbers");

-- fluidized bed combustion systems;

-- coal cleaning systems;

-- solvent refined coal processes;

-- low BTU gasification processes;

-- synthetic crude technology; and

-- coal mining technology

-- In the long run, synthetic high BTU gas produced from coal may provide a substitute for declining natural gas supplies. The Government does not plan to subsidize existing technologies. The Administration will pursue an active RD&D program for advanced high Btu coal gasification. The program will be conducted with the urgency required to ensure that the new technology will be ready when needed.

5. Nuclear Power

a. Plutonium Economy

-- The United States will make a concerted effort, in association with other countries, to find answers to the problems of nuclear proliferation. As part of this effort, the U.S. will defer indefinitely commercial reprocessing and recycling of spent fuels produced in United States civilian nuclear power plants (administrative).

-- In addition, the President has decided to defer indefinitely construction of the Clinch River Liquid Metal Fast Breeder Reactor Demonstration Project and to cancel all component construction, commercializa-

Right of reproduction and redistribution reserved

tion, and licensing efforts. The United States breeder program, and redirect efforts toward evaluation of alternate breeders, fuels, and advanced converter reactors with emphasis on non-proliferation and safety concerns (administrative).

-- The United States has asked other countries to join in examining alternate methods of meeting future needs for nuclear power. As part of this program, the United States must restore confidence in its ability and willingness to supply enriched uranium services. The United States is, therefore, taking three steps to restore that confidence.

-- The United States is re-opening the order books for uranium enrichment services (administrative).

-- The President is proposing legislation, in a separate submission, to guarantee the sale of enrichment services to any country which agrees to comply with our non-proliferation objectives and is willing to accept certain conditions (legislative).

-- The United States will expand its enrichment capacity. Current capacity consists of gaseous diffusion plants. A centrifuge plant uses only 10 percent as much electrical power as a diffusion plant of equivalent capacity. Accordingly, the next plant that the United States will build, for which funds are already in the proposed fiscal 1978 budget, will be a centrifuge plant (administrative/budget).

-- To resolve uncertainties about the extent of domestic uranium resources, ERDA will modify its National Uranium Resources Evaluation program to improve its uranium resource assessment and to include thorium (administrative).

b. Domestic Nuclear Safety and Storage

-- Light water reactors, the type now being built, are not a proliferation hazard.

-- Although light water nuclear reactors have had a good safety record, the President will request the Nuclear Regulatory Commission to expand its audit and inspection staff, to increase unannounced inspections and to assign a permanent inspector to every nuclear site (administrative/budget).

-- The President will request the NRC to make mandatory the current voluntary reporting of minor mishaps and component failures (administrative).

-- The President also will request the NRC to develop firm siting criteria that contain guidelines to prevent siting in densely populated areas, under potentially hazardous or valuable natural areas (administrative).

-- The current licensing process is unsatisfactory to utilities, intervenors, and the Government. Therefore, the President will direct a thorough review of the entire process. As part of this review, he has proposed that reasonable and objective criteria be established for licensing and that plants which are based on standard design not require extensive individual licensing (administrative).

-- The President will direct a review of ERDA's waste disposal program (administrative).

6. Hydroelectric Power

-- The President has directed the Corps of Engineers to report within three months on the potential for additional hydropower installations at existing dams throughout the country -- especially at small sites. Any recommendation will be subject to a thorough environmental and budget review before final decisions are made (administrative).

H. NON-CONVENTIONAL SOURCES OF ENERGY

-- America's hope for long-term economic growth beyond the year 2000 rests on renewable and virtually inexhaustible sources of energy, such as solar and geothermal energy. The Government will promote aggressively the development of renewable resources.

1. Solar Energy

a. Solar tax credits (legislative): To stimulate the development of a large solar market, a tax credit of 40 percent of the first $1,000 and 25 percent of the next $6,400 (maximum of $2,000) paid for the installation of qualifying solar equipment would be provided. The credit would decline over time to 25 percent of the first $1,000 and 15 percent of the next $6,400. The credit, available between April 20, 1977 and December 31, 1984, would be supported by a Federally supported joint Federal/State program of standards development, certification, training information gathering, and public education.

b. Business investment tax credit (legislative): The solar industry will be aided further by the inclusion of investments in solar equipment for industrial and commercial purposes among the approved conservation measures eligible for the proposed 10 percent tax credit for energy-saving investments.

c. Federal Energy Management Program (administrative/budget): The Federal government will demonstrate its confidence in solar technology by undertaking a three year solar program for Federal buildings with up to $100 million.

d. State support: States are urged to amend their property tax laws to exempt solar installations from assessments, to enact legislation to protect access to the sun, and to promote consumer education in the solar field. State public utility commissions would be required to develop guidelines to prevent utilities from discriminating against users of solar energy or other alternative energy sources.

2. Geothermal Energy

a. Tax deductions (legislative): To stimulate geothermal drilling, the President will propose a tax deduction for intangible drilling costs comparable to that now available for oil and gas drilling.

b. Procedural streamlining (administrative): The Departments of Interior and Agriculture will streamline their leasing and environmental review procedures to remove unnecessary barriers to development of geothermal resources.

I. RESEARCH DEVELOPMENT AND DEMONSTRATION OF DECENTRALIZED SYSTEMS

1. Reorganization (administrative/budget): A new Office of Small-Scale Technology is proposed within the Department of Energy in order to tap more fully the great potential of the Nation's individual inventors and small business firms.

2. Solar, Geothermal and Other Technologies (budget): The Government will provide increased funding for photovoltaic systems, solar space cooling and other solar buildings technologies, small wind energy conversion systems, and demonstration projects on wood-derived biomass. The Government will also fund programs for additional work on gas-fired heat pumps and small fuel cells for residential and commercial heating and cooling. Additional funding will be provided to identify new hydrothermal sources which could be tapped for near-term generation of electricity and for direct thermal use. The Government will also support demonstration of direct, non-electric uses of geothermal energy for residential space conditioning and industrial and agricultural process heat in areas where this resource has not previously been exploited.

Right of reproduction and redistribution reserved

Goldman Sachs Seminar May 1977
Background dope successes traffic projections

J. TRANSPORTATION STUDY

During the era of cheap energy, the United States developed a national energy transportation system principally for moving oil and natural gas from the South and the Texas Panhandle to the North and Northeast. With growing prospects for increased supplies of oil and gas from Alaska and the Outer Continental Shelf, as well as the possibility of increases in western coal production, the Nation urgently needs to reassess its energy transportation system. The President will establish a Commission to study and make recommendations concerning the national energy transportation system.

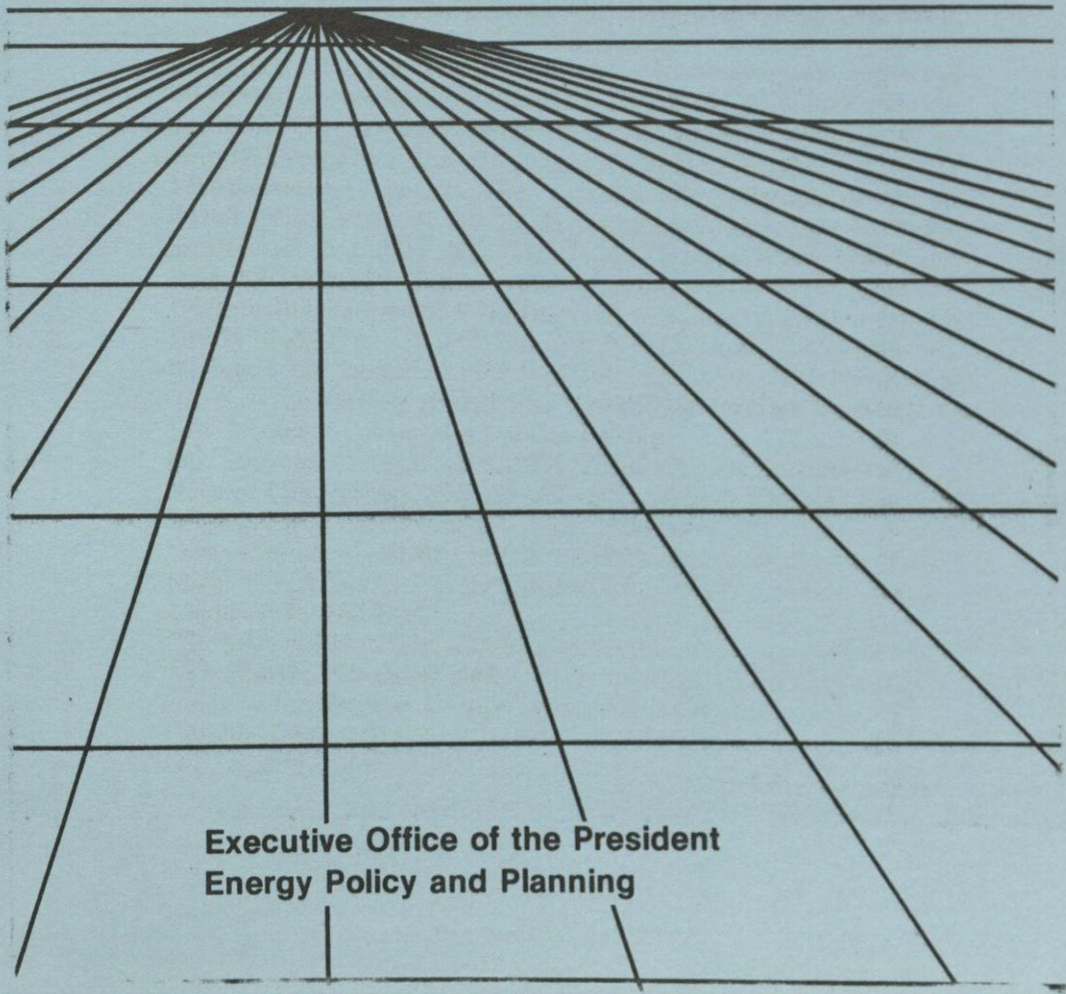
Appendix A
TAX AND REBATE SCHEDULE FOR NEW CAR SALES

Miles Per Gallon		Tax or Rebate							
At Least	But Less Than	1978	1979	1980	1981	1982	1983	1984	1985
--	12.5		*	*	935	*	1524	*	2488
12.0	13.0	449	553	666	*	1159	*	1819	*
12.5	13.5	*	*	*	774	*	1294	*	2146
13.0	14.0	345	436	538	*	972	*	1559	*
13.5	14.5	*	*	*	637	*	1098	*	1854
14.0	15.0	256	339	428	*	812	*	1336	*
14.5	15.5	*	*	*	519	*	929	*	1603
15.0	16.0	179	258	333	*	674	*	1143	*
15.5	16.5	*	*	*	416	*	782	*	1384
16.0	17.0	112	176	249	*	553	*	974	*
16.5	17.5	*	*	*	325	*	653	*	1192
17.0	18.0	52	111	176	*	446	*	825	*
17.5	18.5	*	*	*	245	*	539	*	1021
18.0	19.0	0	52	111	*	351	*	693	*
18.5	19.5	*	*	*	174	*	437	*	869
19.0	20.0	-47	0	52	*	266	*	574	*
19.5	20.5	*	*	*	110	*	345	*	733
20.0	21.0	-89	-47	0	*	189	*	467	*
20.5	21.5	*	*	*	52	*	262	*	610
21.0	22.0	-128	-90	-47	*	120	*	371	*
21.5	22.5	*	*	*	0	*	188	*	499
22.0	23.0	-163	-129	-90	*	57	*	283	*
22.5	23.5	*	*	*	-47	*	119	*	397
23.0	24.0	-195	-165	-130	*	0	*	203	*
23.5	24.5	*	*	*	-91	*	57	*	304
24.0	25.0	-224	-197	-166	*	-52	*	129	*
24.5	25.5	*	*	*	-131	*	0	*	219
25.0	26.0	-251	-227	-199	*	-101	*	62	*
25.5	26.5	*	*	*	-168	*	-52	*	140
26.0	27.0	-276	-255	-230	*	-145	*	0	*
26.5	27.5	*	*	*	-202	*	-101	*	67
27.0	28.0	-299	-281	-259	*	-187	*	-57	*
27.5	28.5	*	*	*	-234	*	-147	*	0
28.0	29.0	-321	-305	-285	*	-225	*	-111	*
28.5	29.5	*	*	*	-264	*	-189	*	-62
29.0	30.0	-341	-327	-310	*	-261	*	-161	*
29.5	30.5	*	*	*	-291	*	-228	*	-121
30.0	31.0	-359	-348	-333	*	-295	*	-207	*
30.5	31.5	*	*	*	-317	*	-265	*	-176
31.0	32.0	-377	-367	-354	*	-326	*	-251	*
31.5	32.5	*	*	*	-340	*	-299	*	-227
32.0	33.0	-393	-385	-374	*	-355	*	-292	*
32.5	33.5	*	*	*	-363	*	-331	*	-275
33.0	34.0	-408	-402	-393	*	-383	*	-330	*
33.5	34.5	*	*	*	-385	*	-361	*	-320
34.0	35.0	-423	-416	-411	*	-409	*	-366	*
34.5	35.5	*	*	*	-405	*	-390	*	-362
35.0	36.0	-436	-433	-428	*	-433	*	-400	*
35.5	36.5	*	*	*	-423	*	-417	*	-403
36.0	37.0	-449	-448	-444	*	-456	*	-433	*
36.5	37.5	*	*	*	-441	*	-442	*	-440
37.0	38.0	-461	-461	-459	*	-478	*	-463	*
37.5	38.5	*	*	*	-458	*	-467	*	-476
38.0	39.0	-473	-474	-473	*	-499	*	-492	*
38.5	39.5	*	*	*	-474	*	-490	*	-493
39.0	--	-473	-474	-473	*	-499	*	-492	*
Electric Cars		-471	-474	-473	-474	-499	-490	-492	-493

-- End of Supplement --

Published by THE BUREAU OF NATIONAL AFFAIRS, INC., WASHINGTON, D.C. 20037
Right of reproduction and redistribution reserved

The National Energy Plan



Executive Office of the President
Energy Policy and Planning

Goldman Sach Seminar May 1977
Background dope suches traffic projections

THE WHITE HOUSE
WASHINGTON

April 29, 1977.

In each period of our history, the nation has responded to challenges which have demanded the best in all of us.

This is one of those time.

Our energy crisis is an invisible crisis, which grows steadily worse—even when it is not in the news. It has taken decades to develop, as our demand for energy has grown much faster than our supply. It will take decades to solve. But we still have time to find answers in a planned, orderly way—if we define the changes we must make and if we begin now.

This report explains why we have to act, and gives you the details of our Plan. The Plan is complicated. I am sure that many people will find some feature of it they will dislike along with features they can support. But it is a carefully balanced Plan, which depends for its effectiveness on all of its major parts.

Above all it is fair. Our guiding principle, as we developed the Plan, was that none of our people should be asked to bear an unfair burden, and none should reap an unfair advantage. There will be sacrifices, but they will be gradual, reasonable—and fair.

The changes the Plan recommends will mean a new direction in American life. In some cases heading in that direction may seem inconvenient. But I have faith that meeting this challenge will make our lives more satisfying.

We can rediscover the ingenuity and the efficiency which have made our nation prosper, rather than deepening our dependence on insecure imports and increasingly expensive conventional energy supplies. We can rediscover small-scale, more creative ways of satisfying our needs. If we are successful, we can protect jobs, the environment, and the basic American standard of living, not only for ourselves but also for our children and grandchildren.

I know that, if we work together as a united people, we will succeed.

Jimmy Carter

Goldman Sach Seminar May 1977
Background dope re success traffic projections

CONTENTS

Page
Overview ---------- VII
Summary of the National Energy Plan ---------- XV
Chapter I.—The Origins of the U.S. Energy Problem ---------- 1
Chapter II.—The Continuing Crisis ---------- 9
  U.S. Energy Demand ---------- 9
  Oil ---------- 11
  Natural Gas ---------- 16
  Implications for the United States ---------- 19
  Implications for the International Community ---------- 21
Chapter III.—Principles and Strategy of the National Energy Plan ---------- 25
  Principles ---------- 25
  The Broad Perspective ---------- 32
Chapter IV.—The National Energy Plan: Conservation and Energy Efficiency ---------- 35
  Transportation ---------- 35
  Buildings ---------- 40
  Appliances ---------- 43
  Fuel Efficiency in Industry ---------- 43
  Cogeneration and District Heating ---------- 45
  Utility Reform ---------- 46
  Savings From Conservation ---------- 47
Chapter V.—The National Energy Plan: Oil and Natural Gas ---------- 49
  The Context of Oil and Natural Gas Pricing ---------- 49
  Oil Pricing ---------- 50
  Natural Gas Pricing ---------- 52
  Alaskan Oil ---------- 55
  Outer Continental Shelf ---------- 56
  Shale Oil ---------- 56
  Liquified Natural Gas ---------- 57
  Synthetic Natural Gas ---------- 57
  New Sources of Natural Gas ---------- 58
  Study of the National Energy Transportation System ---------- 58
  Gasoline Decontrol ---------- 59
  Oil Imports ---------- 59

	Page
Chapter VI.—The National Energy Plan: Coal, Nuclear, and Hydroelectric Power	63
Coal	63
Conversion to Coal and Alternative Fuels	63
Environmental Policy	67
Coal Research	68
Nuclear Power	69
Hydroelectric Power	73
Chapter VII.—The National Energy Plan: Nonconventional Sources and Energy Research	75
Solar Energy	75
Municipal Solid Waste	77
Geothermal Energy	77
Fusion	78
Research, Development, and Demonstration	79
Chapter VIII.—The National Energy Plan: The Role of Government and the American Public	83
National Energy Goals	83
The Department of Energy	84
Information	85
Competition	86
State and Local Government Participation	89
Emergency Assistance for Low-Income Persons	90
Public Participation	90
Chapter IX.—The National Energy Plan and the Future	93
The Impact of the Plan on the Energy Crisis	94
The Economic Consequences of the Plan	97
The Impact of the Plan on Citizens and the Environment	98
The Future Beyond 1985	100
Conclusion	103

Overview

The diagnosis of the U.S. energy crisis is quite simple: demand for energy is increasing, while supplies of oil and natural gas are diminishing. Unless the U.S. makes a timely adjustment before world oil becomes very scarce and very expensive in the 1980's, the nation's economic security and the American way of life will be gravely endangered. The steps the U.S. must take now are small compared to the drastic measures that will be needed if the U.S. does nothing until it is too late.

How did this crisis come about?

Partly it came about through lack of foresight. Americans have become accustomed to abundant, cheap energy. During the decades of the 1950's and 1960's, the real price of energy in the U.S. fell 28 percent. And from 1950 until the quadrupling of world oil prices in 1973–1974, U.S. consumption of energy increased at an average annual rate of 3.5 percent. As a result of the availability of cheap energy, the U.S. developed a stock of capital goods—such as homes, cars, and factory equipment—that uses energy inefficiently.

The Nature of the Problem

The most critical increase in demand has been for oil, the most versatile and widely used energy resource. To meet that growing demand, the U.S. has turned increasingly to imports. In January and February of 1977, the U.S. imported about 9 million barrels of oil per day, half of total domestic oil consumption. By 1985, U.S. oil consumption could equal 12 to 16 million barrels per day.

U.S. domestic oil production has been declining since 1970. New production from Alaska, the deep Outer Continental Shelf, and new recovery methods should reverse the decline, but will be unable to satisfy the projected growth in U.S. demand. Other major additions to domestic oil supply are unlikely.

The principal oil-exporting countries will not be able to satisfy all the increases in demand expected to occur in the U.S. and other countries throughout the 1980's. In 1976, the 13 OPEC countries exported 29 million barrels of oil per day. If world demand continues to grow at the rates of recent years, by 1985 it could reach or exceed 50 million barrels per day. However, many OPEC countries cannot significantly expand production; and, in some, production will actually decline. Thus, as a practical matter, overall OPEC production could approach the expected level of world demand only if Saudi Arabia greatly increased its oil production. Even if Saudi Arabia did so, the highest

Goldman Sach Seminar May 1977
Background dope such as traffic projections

levels of OPEC production probably would be inadequate to meet increasing world demand beyond the late 1980's or early 1990's.

There are physical and economic limits on the world's supply of oil. A widely used geological estimate of total recoverable world oil resources, past and present, is about 2 trillion barrels. More than 360 billion barrels have already been consumed. Current proved crude reserves are 600 billion barrels. World consumption of oil has grown at an average annual rate of 6.6 percent since 1940, and it grew by as much as 8 percent annually during the 1960's.

If it could be assumed that world demand for oil would grow at an annual rate of only 3 percent, and if it were possible (which it is not) that production would keep pace with that rate of growth, the world's presently estimated recoverable oil resources would be exhausted before 2020. At a conjectural growth rate of 5 percent, those resources would be exhausted by 2010. Despite some uncertainty about the exact size of recoverable world oil resources, and about the rate of increase of productive capacity, this fundamental fact is clear: *within about four generations, the bulk of the world's supply of oil, created over hundreds of millions of years, will have been substantially consumed.*

Of course, actual physical exhaustion of oil resources will not occur. Even today, well over half the oil in existing fields is being left in the ground because additional recovery would be too expensive. As production by conventional methods declines and oil becomes more scarce, its price will rise and more expensive recovery methods and novel technologies will be used to produce additional oil. As this process continues, the price of oil will become prohibitive for most energy uses. Eventually the nations of the world will have to seek substitutes for oil as an energy source, and oil will have to be reserved for petrochemical and other uses in which it has maximum value.

The world now consumes about 20 billion barrels of oil per year. To maintain even that rate of consumption and keep reserves intact, *the world would have to discover another Kuwait or Iran roughly every three years, or another Texas or Alaska roughly every six months.* Although some large discoveries will be made, a continuous series of such finds is unlikely. Indeed, recent experience suggests that, compared to world oil consumption, future discoveries will be small or moderate in size, will occur in frontier areas, and will yield oil only at very high cost. Obviously, continued *high rates of growth* of oil consumption simply cannot be sustained.

Natural gas supplies are also limited. In the U.S., natural gas constitutes only 4 percent of conventional energy reserves, but supplies 27 percent of energy consumption. Gas consumption grew about 5.7 percent per year between 1960 and 1970. From 1970 to 1974, however, consumption dropped 1.3 percent. The demand for gas is

considerably higher than the amount that can be supplied. Hence, gas is rationed by prohibitions on hook-ups for new homes in many areas.

Gas is not only in short supply, but its allocation across the country is distorted, and its distribution among end-uses is unsatisfactory. Federal regulation of the wellhead price of natural gas in interstate commerce has discouraged its distribution from gas producing States to other States, and has encouraged consumption of this premium fuel for less essential uses. Industry and utilities currently consume almost 60 percent of U.S. natural gas, despite the fact that other fuels could be used in a majority of cases.

During the 1973–75 period, only 19 percent of new gas reserve additions were made available to the interstate market, and much of that gas was from the Federal domain. Since the price of intrastate gas is not regulated, there are strong economic incentives to sell gas within the producing States. *The existing distinction between intrastate and interstate sales has given intrastate users first claim to natural gas.*

Strategies and Objectives

The U.S. has three overriding energy objectives:

- —as an immediate objective that will become even more important in the future, to reduce dependence on foreign oil and vulnerability to supply interruptions;
- —in the medium term, to keep U.S. imports sufficiently low to weather the period when world oil production approaches its capacity limitation; and
- —in the long term, to have renewable and essentially inexhaustible sources of energy for sustained economic growth.

The U.S. and the world are at the early stage of an energy transition. Previous energy transitions in the U.S. were stimulated by new technologies, such as the development of the railroad and the mass production of automobiles, which fostered the use of coal and oil, respectively. The latest transition springs from the need to adjust to scarcity and higher prices.

To make the new transition, the U.S. should adhere to basic principles that establish a sound context for energy policy and provide its main guidelines. The energy crisis must be addressed comprehensively by the Government and by a public that understands its seriousness and is willing to make necessary sacrifices. Economic growth with high levels of employment and production must be maintained. National policies for the protection of the environment must be continued. Above all, the U.S. must solve its energy problems in a manner that is fair to all regions, sectors and income groups.

The salient features of the National Energy Plan are:

- —conservation and fuel efficiency;
- —rational pricing and production policies;
- —reasonable certainty and stability in Government policies;

—substitution of abundant energy resources for those in short supply; and

—development of nonconventional technologies for the future.

Conservation and fuel efficiency are the cornerstone of the proposed National Energy Plan. Conservation is cheaper than production of new supplies, and is the most effective means for protection of the environment. It can contribute to international stability by moderating the growing pressure on world oil resources. Conservation and improved efficiency can lead to quick results. For example, a significant percentage of poorly insulated homes in the United States could be brought up to strict fuel-efficiency standards in less time than it now takes to design, build, and license one nuclear powerplant.

Although conservation measures are inexpensive and clean compared with energy production and use, they do sometimes involve sacrifice and are not always easy to implement. If automobiles are to be made lighter and less powerful, the American people must accept sacrifices in comfort and horsepower. If industry is required to make energy-saving investments and to pay taxes for the use of scarce resources, there will be some increases in the cost of consumer products. These sacrifices, however, need not result in major changes in the American way of life or in reduced standards of living. Automobile fuel efficiency can be greatly improved through better design and use of materials, as well as by producing lighter and less powerful cars, without inhibiting Americans' ability to travel. With improved energy efficiency, the impact of rising energy prices can be significantly moderated.

Energy conservation, properly implemented, is fully compatible with economic growth, the development of new industries, and the creation of new jobs for American workers. Energy consumption need not be reduced in absolute terms; what is necessary is a slowing down in its rate of growth. By making adjustments in energy consumption now, the U.S. can avoid a possibly severe economic recession in the mid 1980's.

The U.S. has a clear choice. If a conservation program begins now, it can be carried out in a rational and orderly manner over a period of years. It can be moderate in scope, and can apply primarily to capital goods, such as homes and automobiles. If, however, conservation is delayed until world oil production approaches its capacity limitation, it will have to be carried out hastily under emergency conditions.

It will be sudden, and drastic in scope; and because there will not be time to wait for incremental changes in capital stock, conservation measures will have to cut much more deeply into patterns of behavior, disrupt the flow of goods and services, and reduce standards of living.

Pricing policies should encourage proper responses in both the consumption and the production of energy, without creating any windfall profits. *If users pay yesterday's prices for tomorrow's energy, U.S. resources will be rapidly exhausted. If producers were to receive tomorrow's prices for yesterday's discoveries, there would be an inequitable transfer of income from the American people to the producers, whose profits would be excessive and would bear little relation to actual economic contribution.*

Currently, Federal pricing policy encourages overconsumption of the scarcest fuels by artificially holding down prices. If, for example, the cost of expensive foreign oil is averaged with cheaper domestic oil, consumers overuse oil, and oil imports are subsidized and encouraged. Consumers are thus misled into believing that they can continue to obtain additional quantities of oil at less than its replacement cost.

Artificially low prices for some energy sources also distort interfuel competition. The artificially low price of natural gas, for example, has encouraged its use by industry and electric utilities, which could use coal, and in many areas has made gas unavailable for new households, which could make better use of its premium qualities.

These misguided Government policies must be changed. But neither Government policy nor market incentives can improve on nature and create additional oil or gas in the ground. From a long-term perspective, prices are an important influence on production and use. As long as energy consumers are misled into believing they can obtain energy cheaply, they will consume energy at a rate the U.S. cannot afford to sustain. Their continued overuse will make the nation's inevitable transition more drastic and difficult.

A national energy policy should encourage production. The energy industries need adequate incentives to develop *new* resources and are entitled to sufficient profits for exploration for *new* discoveries. But they should not be allowed to reap large windfall profits as a result of circumstances unrelated to the marketplace or their risk-taking.

The fourfold increase in world oil prices in 1973–74 and the policies of the oil-exporting countries should not be permitted to create unjustified profits for domestic producers at consumer's expense. By raising the world price of oil, the oil-exporting countries have increased the value of American oil in existing wells. That increase in value has not resulted from free market forces or from any risk-taking by U.S. producers. *National energy policy should capture the increase in oil value for the American people.* The distribution of the proceeds of higher prices among domestic producers and consumers must be equitable and economically efficient if the United States is to spread the cost fairly across the population and achieve its energy goals.

The pricing of oil and natural gas should reflect the economic fact that the true value of a depleting resource is the cost of replacing it. An effective pricing system would provide the price incentives that producers of oil and natural gas need by focusing on harder to find new supplies. The system should also moderate the adjustment that households will have to make to rising fuel costs. It should end the distortions of the intrastate-interstate distinction for new natural gas, which is a national resource. It should also promote conservation by raising the ultimate price of products made by energy-intensive processes.

Reasonable certainty and stability in Government policies are needed to enable consumers and producers of energy to make investment decisions. A comprehensive national energy plan should resolve a wide range of uncertainties that have impeded the orderly development of energy policy and projects. Some uncertainties are inherent in a market economy, and Government should not shelter industry from the normal risks of doing business. But Government should provide business and the public with a clear and consistent statement of its own policies, rules, and intentions so that intelligent private investment decisions can be made.

Resources in plentiful supply should be used more widely as part of a process of moderating use of those in short supply. Although coal comprises 90 percent of United States total fossil fuel reserves, the United States meets only 18 percent of its energy needs from coal. Seventy-five percent of energy needs are met by oil and natural gas although they account for less than 8 percent of U.S. reserves. This imbalance between reserves and consumption should be corrected by shifting industrial and utility consumption from oil and gas to coal and other abundant energy sources.

As industrial firms and utilities reduce their use of oil and gas, they will have to turn to coal and other fuels. The choices now for electric utilities are basically coal and nuclear power. Expanding future use of coal will depend in large part on the introduction of new technologies that permit it to be burned in an environmentally acceptable manner, in both power plants and factories. Efforts should also be made to develop and perfect processes for making gas from coal.

Light-water nuclear reactors, subject to strict regulation, can assist in meeting the United States energy deficit. The 63 nuclear plants operating today provide approximately 10 percent of U.S. electricity, about 3 percent of total energy output. That contribution could be significantly increased. The currently projected growth rate of nuclear energy is substantially below prior expectations due mainly to the recent drop in demand for electricity, labor problems, equipment delays, health and safety problems, lack of a publicly accepted waste disposal program, and concern over nuclear proliferation. The Government should ensure that risks from nuclear power are kept as low as humanly possible, and should also establish the framework for resolving problems and removing unnecessary delays in the nuclear licensing process.

To the extent that electricity is substituted for oil and gas, the total amounts of energy used in the country will be somewhat larger due to the inherent inefficiency of electricity generation and distribution. But conserving scarce oil and natural gas is far more important than saving coal.

Finally, *the use of nonconventional sources of energy must be vigorously expanded.* Relatively clean and inexhaustible sources of energy offer a hopeful prospect of supplementing conventional energy sources in this century and becoming major sources of energy in the next. Some of these nonconventional technologies permit decentralized production, and thus provide alternatives to large, central systems. Traditional forecasts of energy use assume that nonconventional resources, such as solar and geothermal energy, will play only a minor role in the United States energy future. Unless positive and creative actions are taken by Government and the private sector, these forecasts will become self-fulfilling prophecies. Other technologies that increase the efficiency of energy use should also be encouraged, such as cogeneration, the simultaneous production of industrial process steam and electricity.

A national energy plan cannot anticipate technological miracles. Even so, nonconventional technologies are not mere curiosities. Steady technological progress is likely, breakthroughs are possible, and the estimated potential of nonconventional energy sources can be expected to improve. Some nonconventional technologies are already being used, and with encouragement their use will grow. Because nonconventional energy sources have great promise, the Government should take all reasonable steps to foster and develop them.

The National Energy Plan is based on this conceptual approach. It contains a practical blend of economic incentives and disincentives as well as some regulatory measures. It strives to keep Government intrusion into the lives of American citizens to a minimum. It would return the fiscal surpluses of higher energy taxes to the American people.

Finally, the Plan sets forth goals for 1985 which, although ambitious, can be achieved with the willing cooperation of the American people. These goals are:

- —reduce the annual growth of total energy demand to below 2 percent;
- —reduce gasoline consumption 10 percent below its current level;
- —reduce oil imports from a potential level of 16 million barrels per day to 6 million, roughly one-eighth of total energy consumption;
- —establish a Strategic Petroleum Reserve of 1 billion barrels;
- —increase coal production by two-thirds, to more than 1 billion tons per year;
- —bring 90 percent of existing American homes and all new buildings up to minimum energy efficiency standards; and
- —use solar energy in more than 2½ million homes.

Goldman Sach Seminar May 1977
Background dope such as traffic projections

The Plan would reverse the recent trend of ever-rising oil imports and ever-increasing American dependence on uncertain foreign sources of supply. It would prepare the United States for the time when the world faces a limitation on oil production capacity and consequent skyrocketing oil prices. It would achieve substantial energy savings through conservation and increased fuel efficiency, with minimal disruption to the economy, and would stimulate the use of coal in a manner consistent with environmental protection.

The United States is at a turning point. It can choose, through piecemeal programs and policies, to continue the current state of drift. That course would require no hard decisions, no immediate sacrifices, and no adjustment to the new energy realities. That course may, for the moment, seem attractive. But, with each passing day, the United States falls farther behind in solving its energy problems. Consequently, its economic and foreign policy position weakens, its options dwindle, and the ultimate transition to scarce oil supplies and much higher oil prices becomes more difficult. If the United States faces up to the energy problem now and adopts the National Energy Plan, it will have the precious opportunity to make effective use of time and resources before world oil production reaches its capacity limitation.

The energy crisis presents a challenge to the American people. If they respond with understanding, maturity, imagination, and their traditional ingenuity, the challenge will be met. Even the "sacrifices" involved in conservation will have their immediate rewards in lower fuel bills and the sense of accomplishment that comes with achieving higher efficiency. By preparing now for the energy situation of the 1980's, the U.S. will not merely avoid a future time of adversity. It will ensure that the coming years will be among the most creative and constructive in American history.

Summary of the National Energy Plan

Conservation

In the transportation sector, the Plan proposes the following major initiatives to reduce demand:

- —a graduated excise tax on new automobiles with fuel efficiency below the fleet average levels required under current legislation; the taxes would be returned through rebates on automobiles that meet or do better than the required fleet averages and through rebates on all electric automobiles;
- —a standby gasoline tax, to take effect if total national gasoline consumption exceeds stated annual targets; the tax would begin at 5 cents per gallon, and could rise to 50 cents per gallon in 10 years if targets were repeatedly exceeded by large or increasing amounts; the tax would decrease if a target were met; taxes collected would be returned to the public through the income tax system and transfer payment programs; States would be compensated for lost gasoline tax revenues through sources such as the Highway Trust Fund;
- —fuel efficiency standards and a graduated excise tax and rebate system for light-duty trucks;
- —removal of the Federal excise tax on intercity buses;
- —increase in excise tax for general aviation fuel, and elimination of the existing Federal excise tax preference for motorboat fuel;
- —improvement in the fuel efficiency of the Federal automobile fleet, and initiation of a vanpooling program for Federal employees.

To reduce waste of energy in existing buildings, the Plan proposes a major program containing the following elements:

- —a tax credit of 25 percent of the first $800 and 15 percent of the next $1,400 spent on approved residential conservation measures;
- —a requirement that regulated utilities offer their residential customers a "turnkey" insulation service, with payment to be made through monthly bills; other fuel suppliers would be encouraged to offer a similar service;
- —facilitating residential conservation loans through opening of a secondary market for such loans;
- —increased funding for the current weatherization program for low-income households;

—a [illegible] home conservation loan program;

—a 10 percent tax credit (in addition to the existing investment tax credit) for business investments in approved conservation measures;

—a Federal grant program to assist public and non-profit schools and hospitals to insulate their buildings;

—inclusion of conservation measures for State and local government buildings in the Local Public Works Program.

The development of mandatory energy efficiency standards for new buildings will be accelerated. In addition, the Federal Government will undertake a major program to increase the efficiency of its own buildings.

The Plan proposes the establishment of mandatory minimum energy efficiency standards for major appliances, such as furnaces, air conditioners, water heaters, and refrigerators.

The Plan proposes to remove major institutional barriers to cogeneration, the simultaneous production of process steam and electricity by industrial firms or utilities, and to provide an additional 10 percent tax credit for investment in cogeneration equipment. Encouragement will also be given to district heating, and the Energy Research and Development Administration (ERDA) will undertake a study to determine the feasibility of a district heating demonstration program at its own facilities.

To promote further industrial conservation and improvements in industrial fuel efficiency, an additional 10 percent tax credit for energy-saving investments would be available for certain types of equipment (including equipment for use of solar energy) as well as conservation retrofits of buildings.

The Plan also contains a program for utility reform, with the following elements:

—a phasing out of promotional, declining block, and other electric utility rates that do not reflect cost incidence; declining block rates for natural gas would also be phased out;

—a requirement that electric utilities either offer daily off-peak rates to customers willing to pay metering costs or provide a direct load management system;

—a requirement that electric utilities offer customers interruptible service at reduced rates;

—a prohibition of master metering in most new structures;

—a prohibition of discrimination by electric utilities against solar and other renewable energy sources;

—Federal authority to require additional reforms of gas utility rates;

—Federal Power Commission (FPC) authority to require interconnections and power pooling between utilities even if they are not now subject to FPC jurisdiction, and to require wheeling.

Oil and Natural Gas

Government policy should provide for prices that encourage development of new fields and a more rational pattern of distribution; but it should also prevent windfall profits. It should promote conservation by confronting oil and gas users with more realistic prices, particularly for those sectors of the economy where changes can be made without hardship. To promote these ends, the Plan proposes a new system for pricing oil and natural gas.

The proposal for oil pricing contains the following major elements:

—price controls would be extended;

—newly discovered oil would be allowed to rise over a 3 year period to the 1977 world price, adjusted to keep pace with the domestic price level; thereafter, the price of newly discovered oil would be adjusted for domestic price increases;

—the incentive price for "new oil" would be applicable to oil produced from an onshore well more than 2½ miles from an existing well, or from a well more than 1,000 feet deeper than any existing well within a 2½ mile radius; the incentive price would be applicable to oil from Federal offshore leases issued after April 20, 1977;

—the current $5.25 and $11.28 price ceilings for previously discovered oil would be allowed to rise at the rate of domestic price increases;

—stripper wells and incremental tertiary recovery from old fields would receive the world price;

—all domestic oil would become subject in three stages to a crude oil equalization tax equal to the difference between its controlled domestic price and the world oil price; the tax would increase with the world price, except that authority would exist to discontinue an increase if the world price rose significantly faster than the general level of domestic prices;

—net revenues from the tax would be entirely returned to the economy: residential consumers of fuel oil would receive a dollar-for-dollar rebate, and the remaining funds would be returned to individuals through the income tax system and transfer payment programs;

—once the wellhead tax is fully in effect, the entitlements program would be terminated, along with certain related activities, but would be retained on a standby basis.

The proposal for natural gas pricing contains the following major provisions:

—all new gas sold anywhere in the country from new reservoirs would be subject to a price limitation at the Btu equivalent of the average refiner acquisition cost (before tax) of all domestic crude oil;

Goldman Sach Seminar May 1977
Background dope success traffic projections

—that price limitation would be approximately $1.75 per thousand cubic feet (Mcf) at the beginning of 1978; the interstate-intrastate distinction would disappear for new gas;

—new gas would be defined by the same standards used to define new oil;

—currently flowing natural gas would be guaranteed price certainty at current levels, with adjustments to reflect domestic price increases;

—authority would exist to establish higher incentive pricing levels for specific categories of high-cost gas, for example, from deep drilling, geopressurized zones and tight formations;

—gas made available at the expiration of existing interstate contracts or by production from existing reservoirs in excess of contracted volumes would qualify for a price no higher than the current $1.42 per Mcf ceiling; gas made available under the same circumstances from existing intrastate production would qualify for the same price as new gas;

—the cost of the more expensive new gas would be allocated initially to industrial rather than residential or commercial users;

—Federal jurisdiction would be extended to certain synthetic natural gas facilities;

—taxes would be levied on industrial and utility users of oil and natural gas to encourage conservation and conversion to coal or other energy sources.

The Plan contains the following additional proposals for oil and natural gas:

—to encourage full development of the oil resources of Alaska, Alaskan oil from existing wells would be subject to the $11.28 upper tier wellhead price and would be treated as uncontrolled oil for purposes of the entitlements program; new Alaskan oil finds would be subject to the new oil wellhead price;

—production from Elk Hills Naval Petroleum Reserve would be limited to a ready reserve level at least until the west-to-east transportation systems for moving the surplus Alaskan oil are in place or until California refineries have completed a major retrofit program to enable more Alaskan oil to be used in California;

—the Outer Continental Shelf Lands Act would be amended to require a more flexible leasing program using bidding systems that enhance competition, to assure a fair return to the public, and to assure full development of the OCS resources;

—shale oil will be entitled to the world oil price;

—the guidelines established by the Energy Resources Council in the previous administration would be replaced by a more flexible policy: projects for importation of liquified natural gas (LNG) should be analyzed on a case-by-case basis with respect to the reliability of the selling country, the degree of American dependence the project would create, the safety conditions associated with any specific installation and all costs involved; imported LNG would not be concentrated in any one region; new LNG tanker docks would be prohibited in densely populated areas;

—Federal programs for development of gas from geopressurized zones and Devonian shale would be expanded;

—the Administration hopes to eliminate gasoline price controls and allocation regulations next fall; to maintain competition among marketers, it supports legislation similar to the pending "dealer day in court" bill;

—as part of the extension of oil and natural gas price controls, the Administration would urge that independent producers receive the same tax treatment of intangible drilling costs as their corporate competitors;

—a Presidential Commission will study and make recommendations concerning the national energy transportation system.

To provide relative invulnerability from another interruption of foreign oil supply, the Strategic Petroleum Reserve will be expanded to 1 billion barrels; efforts will be made to diversify sources of oil imports; contingency plans will be transmitted to the Congress; and development of additional contingency plans will be accelerated.

Coal

Conversion by industry and utilities to coal and other fuels would be encouraged by taxes on the use of oil and natural gas.

The Plan also contains a strong regulatory program that would prohibit all new utility and industrial boilers from burning oil or natural gas, except under extraordinary conditions. Authority would also exist to prohibit the burning of oil or gas in new facilities other than boilers. Existing facilities with coal-burning capability would generally be prohibited from burning oil and gas. Permits would be required for any conversion to oil or gas rather than to coal. By 1990, virtually no utilities would be permitted to burn natural gas.

While promoting greater use of coal, the Administration will seek to achieve continued improvement in environmental quality. A strong, but consistent and certain, environmental policy can provide the confidence industry needs to make investments in energy facilities. The Administration's policy would:

—require installation of the best available control technology in all new coal-fired plants, including those that burn low sulfur coal;

—protect eas where the air is still clean from significant deterioration;

—encourage States to classify lands to protect against significant deterioration within 3 years after enactment of Clean Air Act amendments;

—require Governors to announce intent to change the classification of allowable air quality for a given area within 120 days after an application is made to construct a new source in that area;

—require States to approve or disapprove the application within 1 year thereafter.

Further study is needed of the Environmental Protection Agency's policies allowing offsetting pollution trade-offs for new installations. A committee will study the health effects of increased coal production and use, and the environmental constraints on coal mining and on the construction of new coal-burning facilities. A study will also be made of the long-term effects of carbon dioxide from coal and other hydrocarbons on the atmosphere.

The Administration supports uniform national strip mining legislation.

An expansion is proposed for the Government's coal research and development program. The highest immediate priority is development of more effective and economic methods to meet air pollution control standards. The program will include research on:

—air pollution control systems;
—fluidized bed combustion systems;
—coal cleaning systems;
—solvent refined coal processes;
—low Btu gasification processes;
—advanced high Btu gasification processes;
—synthetic liquids technology;
—coal mining technology.

Nuclear Power

It is the President's policy to defer any U.S. commitment to advanced nuclear technologies that are based on the use of plutonium while the United States seeks a better approach to the next generation of nuclear power than is provided by plutonium recycle and the plutonium breeder. The U.S. will defer indefinitely commercial reprocessing and recycling of plutonium. The President has proposed to reduce the funding for the existing breeder program, and to redirect it toward evaluation of alternative breeders, advanced converter reactors, and other fuel cycles, with emphasis on nonproliferation and safety concerns. He has also called for cancellation of construction of the Clinch River Breeder Reactor Demonstration Project and all component construction, licensing, and commercialization efforts.

To encourage other nations to pause in their deve pment of plutonium-based technology, the United States should seek to restore confidence in its willingness and ability to supply enrichment services. The United States will reopen the order books for U.S. uranium enrichment services, and will expand its enrichment capacity by building an energy-efficient centrifuge plant. The President is also proposing legislation to guarantee the delivery of enrichment services to any country that shares U.S. nonproliferation objectives and accepts conditions consistent with those objectives.

To resolve uncertainties about the extent of domestic uranium resources, ERDA will reorient its National Uranium Resources Evaluation Program to improve uranium resource assessment. The program will also include an assessment of thorium resources.

The United States has the option of relying on light-water reactors to provide nuclear power to meet a share of its energy deficit. To enhance the safe use of light-water reactors:

—the Nuclear Regulatory Commission (NRC) has already increased the required number of guards at nuclear plants and the requirements for the training that guards receive;

—the President is requesting that the NRC expand its audit and inspection staff to increase the number of unannounced inspections and to assign one permanent Federal inspector to each nuclear power plant;

—the President is requesting that the Commission make mandatory the current voluntary reporting of minor mishaps and component failures at operating reactors;

—the President is requesting that the NRC develop firm siting criteria with clear guidelines to prevent siting of nuclear plants in densely populated locations, in valuable natural areas, or in potentially hazardous regions.

The President has directed that a study be made of the entire nuclear licensing process. He has proposed that reasonable and objective criteria be established for licensing and that plants which are based on a standard design not require extensive individual licensing.

To ensure that adequate waste storage facilities are available by 1985, ERDA's waste management program has been expanded to include development of techniques for long-term storage of spent fuel. Also, a task force will review ERDA's waste management program. Moreover, improved methods of storing spent fuel will enable most utilities at least to double their current storage capacity without constructing new facilities.

Hydroelectric Power

The Department of Defense (Corps of Engineers), together with other responsible agencies, will report on the potential for installation

Goldman Sach Seminar May 1977
Background dope such as traffic projections

of additional hydroelectric generating capacity at existing dams throughout the country.

Nonconventional Resources

America's hope for long-term economic growth beyond the year 2000 rests in large measure on renewable and essentially inexhaustible sources of energy. The Federal Government should aggressively promote the development of technologies to use these resources.

Solar Energy

Solar hot water and space heating technology is now being used and is ready for widespread commercialization. To stimulate the development of a large solar market, a tax credit is proposed. The credit would start at 40 percent of the first $1,000 and 25 percent of the next $6,400 paid for qualifying solar equipment. The credit would decline in stages to 25 percent of the first $1,000 and 15 percent of the next $6,400. The credit would be supported by a joint Federal-State program of standards development, certification, training, information gathering, and public education. Solar equipment used by business and industry would be eligible for an additional 10 percent investment tax credit for energy conservation measures.

Geothermal Energy

Geothermal energy is a significant potential energy source. The tax deduction for intangible drilling costs now available for oil and gas drilling would be extended to geothermal drilling.

Research, Development and Demonstration

An effective Federal research, development and demonstration program is indispensable for the production of new energy sources. The Federal Government should support many research options in their early stages, but continue support into the later stages only for those that meet technical, economic, national security, health, safety, and environmental criteria. Research and development should be accompanied by preparation for commercialization so that successful projects can rapidly be put to practical use.

Additional research, development and demonstration initiatives are proposed, with emphasis on small, dispersed and environmentally sound energy systems.

An Office of Small-Scale Technologies would be established to fund small, innovative energy research and development projects. The office would enable individual inventors and small businesses to contribute to the national energy research and development effort.

Information

A three-part energy information program is proposed. A Petroleum Production and Reserve Information System would provide the Federal Government with detailed, audited data on petroleum reserve estimates and production levels. A Petroleum Company Financial Data System would require all large companies and a sample of small firms engaged in crude oil or natural gas production to submit detailed financial information to the Federal Government. Data required from integrated companies would permit evaluation of the performance of their various segments by providing vertical accountability. An Emergency Management Information System would provide the Federal and State governments with information needed to respond to energy emergencies.

Competition

Effective competition in the energy industries is a matter of vital concern. The Under Secretary for policy and evaluation in the proposed Department of Energy would be responsible for making certain that policies and programs of the Department promote competition. Although at this time it does not appear necessary to proceed with new legislation for either horizontal or vertical divestiture of the major oil companies, their performance will be monitored. The proposed information program would greatly assist that effort.

A present anomaly in the availability of the tax deduction for intangible drilling costs within the oil industry would be removed as part of the program for extending oil and natural gas price controls.

Emergency Assistance for Low-Income Persons

Existing emergency assistance programs are deficient in assisting low-income persons to meet sharp, temporary increases in energy costs due to shortages or severe winters. A redesigned program will be completed promptly and submitted to the Congress.

Goldman Sach Seminar May 1977
Background dope-success traffic projections

Chapter I.–The Origins of the U.S. Energy Problem

Abundant, cheap energy has been a decisive element in the creation of modern America. Since the industrial revolution, fossil energy has increasingly replaced human labor in the workplace, supported a growing population, and led to a spectacular growth in productivity and higher standards of living for Americans. Today, the entire stock of capital goods—from poorly insulated buildings to heavy and powerful automobiles—is tailored to plentiful and cheap energy.

But the days of abundance are now drawing to a close, and American society faces sobering new energy realities. Domestic reserves of oil and natural gas, the nation's predominant energy sources since World War II, have been declining since 1970. Imported oil and other possible substitutes for oil and gas are now expensive. As a result, the available supply of cheap oil and gas is being rapidly exhausted, and consumption of them cannot continue to grow at the pace to which Americans have become accustomed. Fundamental changes in the supply and cost of oil and gas will reshape the United States during the remainder of this century.

Today, America's primary source of energy is oil, which provides nearly half the energy consumed and is used in all sectors of the economy. Oil was developed originally as a source of artificial light and as a lubricant. In the 1870's and 1880's, illumination from new forms of gas manufactured from coal began to appear, and Edison invented the incandescent light. By the outbreak of World War I, industrial and residential heating had become the principal use of oil.

In the early years of this century, the age of the mass-produced automobile—and the age of oil—really began. The number of registered automobiles increased from 8,000 in 1900 to over 1 million in 1913, 10 million in 1922, and 27.5 million in 1940. American oil production rose from 64 million barrels in 1900 to 1.4 billion barrels in 1940. By 1950, oil had replaced coal as the predominant energy source in the United States.

Demand for natural gas followed a similar course. Gas was originally a discarded by-product of oil extraction, but its consumption grew with the development of pipeline systems that could deliver it cheaply to nationwide markets.

Between 1945 and 1960, gas became the predominant fuel for residential heating, and began to replace oil and coal as a boiler fuel for industry and electric utilities. Its cleanness and extremely low price induced both industrial and residential users to switch from coal and become heavily dependent on natural gas. Today, natural gas meets about one-fourth of U.S. energy needs.

During the period from 1950 to 1970, the real cost of energy in the United States decreased 28 percent. Much of the decrease resulted from declining real prices for oil imports, which grew from 900,000 barrels per day in 1950 to 3.4 million barrels per day in 1970. The expansion of imports was made possible by new production from large reservoirs of oil overseas, and by the development of an efficient, economic international oil transportation system.

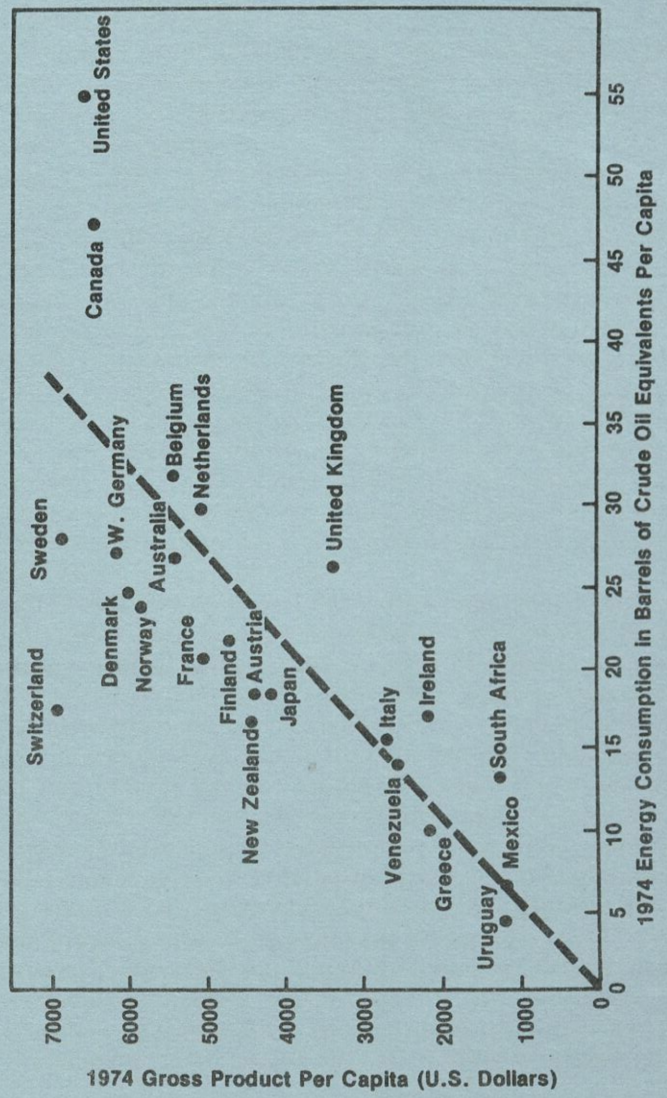
During the two decades of falling real energy prices, America's gross national product rose an unprecedented 102 percent or 3.6 percent per year, and domestic energy consumption grew at an average annual rate of 3.5 percent, for a total increase of 98 percent. The effects of increased affluence and energy demand were felt throughout society, as Americans in homes, farms, factories, and offices turned to energy-consuming machines and appliances for liberation from daily drudgery.

Buildings generally were constructed with little or no insulation or regard for energy-saving design. Air-conditioners became commonplace. Automobile weight and horsepower increased. Cheap automobile transportation helped to shape major metropolitan areas with widely distributed suburban development and inadequate mass transportation. Petroleum-based plastics and textiles replaced many natural fibers, wood, and other materials. Wider use of electricity resulted in generally less efficient use of oil, gas, and coal because three units of primary energy are consumed in the generation and transmission of every unit of electrical energy. During the entire postwar period—until the quadrupling of world oil prices in 1973–74—almost all economic and technological developments were premised on cheap energy, while the costs of other factors of production increased.

Today, America consumes far more energy than any other nation. With less than 6 percent of the world's population, the United States consumes more than 30 percent of the world's energy. As Figure I–1 shows, the United States uses more energy per dollar of gross national product than any other industrialized nation. America consumes twice as much energy per capita as West Germany, which has a similar standard of living.

America's rapidly growing demand for energy has not resulted entirely from broad economic and social developments. With some exceptions, such as the restrictions on oil imports during the period when foreign oil was cheap, Government policies have generally stimulated energy demand. Tax benefits to producers and regulation of prices to consumers have kept the price of energy below its true replacement cost, and thereby promoted consumption and waste.

Energy Consumption Per Unit of GNP



Source of Data: U.N. Statistical Yearbook, 1975

Figure I–1

Large-volume consumers of electricity and natural gas have been given discounts. Government policy has subsidized and protected energy-inefficient truck and air transportation. The interstate highway system has encouraged automobile use. Local highways have drawn people, businesses, and industry out of central cities into suburbia. Thus, the American people have been led to believe that the oil and gas they consume will remain cheap, when in fact new additions to oil and gas supply already are expensive and inevitably will become more so.

Compound growth of demand for energy can produce striking results within a surprisingly short time. If demand for energy increases at the long-term annual average of 3 percent, it doubles in 24 years. Compound growth at an annual average of 4.3 percent, the rate prevailing from 1963 to 1973, would double energy consumption in 16 years. At 7 percent, the rate at which electricity consumption grew during the 1960's, energy consumption would double in 10 years. The difference between a U.S. growth rate of 3.5 percent (the 1950–73 average) and a growth rate of 2.3 percent (the 1968–76 average) would result in the consumption of 20 million additional barrels of oil equivalent per day in the year 2000.[1] (See Figure I–2.) That would be an increment of more than one-half of total 1976 daily energy consumption.

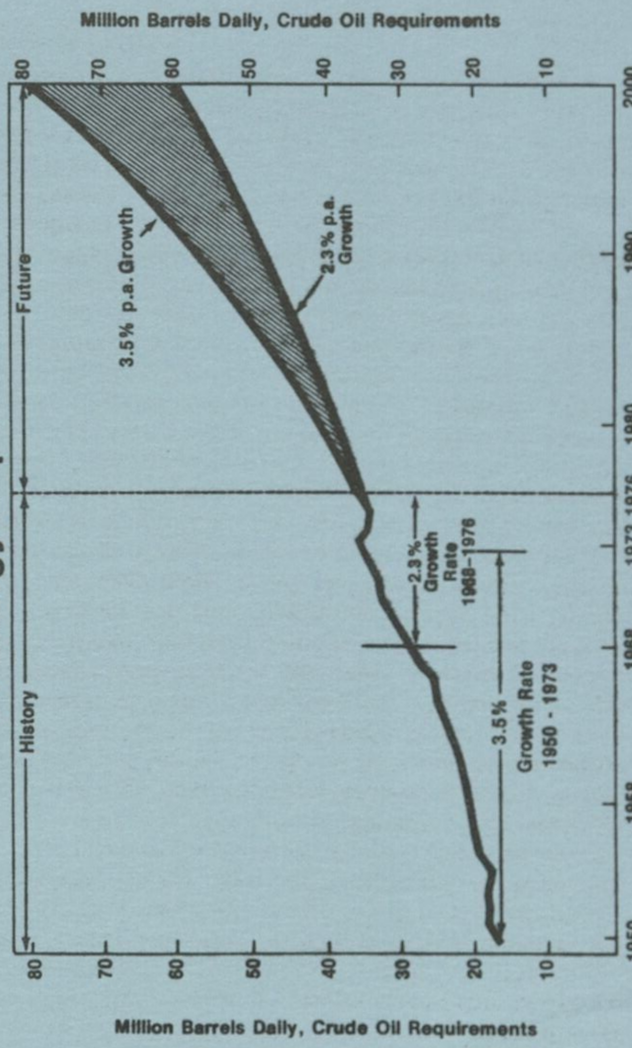
The domestic sources of energy which have largely satisfied growing U.S. demand since World War II are declining. U.S. oil production has been falling since 1970. Alaskan oil will boost U.S. production for a few years; but then, without significant new discoveries, production will decline or remain static. World production of oil is likely to approach its capacity limitation by the mid-1980's, so the United States cannot look to an expanding supply of imported oil as it has in the past. U.S. natural gas production has been declining since 1973. In sum, the supplies of oil and natural gas now available to the United States cannot possibly serve to sustain continued growth of demand at rates like those of recent years.

America is now at an historic turning point as the postwar era of oil and gas comes to a close. America has made two major energy transitions in the past, but in very different circumstances (see Figure I–3). After the Civil War, wood, waterwheels, and windmills largely gave way to coal. Although these resources were abundant, technological progress made it feasible and more economical to use coal in railroad transportation, for industrial process heat, and for home heating. Coal supplied more than half of U.S. energy needs from about 1885 to about 1940. During the 1950's, the transition from coal to oil and

---

[1] Throughout this report, quantities of energy are expressed in terms of barrels of oil (petroleum product) per day. One million barrels of oil per day equals 1.96 trillion cubic feet of natural gas per year, or 88 million tons of coal per year.

A Lower Growth Rate Can Make A Large Difference In Energy Requirements

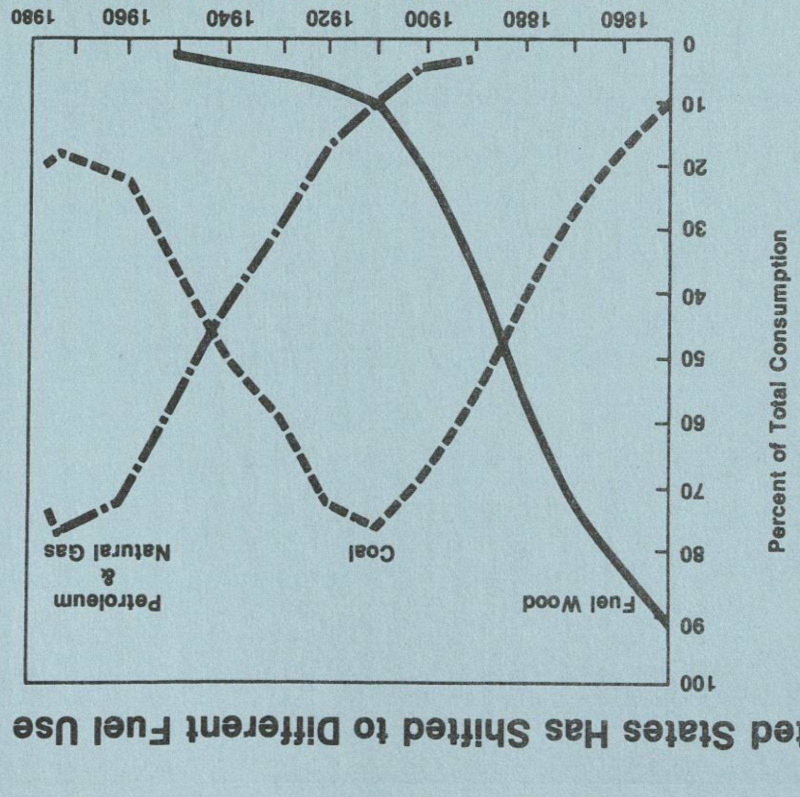


Source: U.S. Bureau Of Mines.

Figure I–2

Goldman Sach Seminar May 1977
Background dope succeeds traffic projections

The United States Has Shifted to Different Fuel Use Patterns



Source: U.S. Bureau of Mines and Federal Energy Administration.

Figure I–3

natural gas was completed, and they became America's predominant energy sources. This second transition, from one abundant fuel to two others, also resulted from technological progress, as well as the lower cost, cleanness, and ease of handling of oil and natural gas. The transition did not result from any shortage of coal, which even today is a vast resource.

The energy crisis that now faces America results from the divergence between its historically increasing energy demand and its decreasing supplies of oil and natural gas. To meet this crisis, America must make a new kind of energy transition—from a period of abundant, cheap oil and gas to a period when these resources will be in short supply.

Historically, the United States has depended on technological progress to solve many of its problems. There is hope that technological developments will provide long-term solutions to the energy problem. But, in the energy field, technologies develop slowly. Someday, the U.S. probably will be able to rely on such abundant resources as solar energy, geothermal energy, and, perhaps, fusion; but, even under the most optimistic estimates, those resources will not become major suppliers of energy until after the year 2000. America landed a man on the moon in a decade, but finding substitutes for oil and natural gas is a far more difficult and time-consuming job that must be accomplished within economic, social, health and environmental constraints.

The coming energy transition can be made in three stages. In the short term, from now until 1985, the United States can reduce its rate of growth of demand for energy generally and for oil in particular, reallocate natural gas to high priority uses, increase the use of abundant conventional energy sources, and build up the Strategic Petroleum Reserve to protect against another interruption of foreign oil supply. During this period, the U.S. stock of capital goods can be adjusted to the new realities of scarcity. By the mid-1980's, when world oil production is likely to approach its capacity limitation, the United States could be in a position to reduce its demand for foreign oil. Beyond 2000, the United States will need new energy sources to maintain economic growth and a high standard of living.

If America takes action now, it can accomplish the transition in an orderly way. With sufficient time, the U.S. can modify its capital stock to make it more efficient. However, if action is delayed, the transition will have to be made abruptly with measures, such as rationing, that operate directly on behavior and at the expense of the immediate flow of goods and services.

Goldman Sachs Seminar May 1977
Background depresses traffic projections

Chapter II.–The Continuing Crisis

Another sudden quadrupling of the world price of oil, like that in 1973–74, is improbable. Although the danger of another interruption of oil imports is real, there does not appear to be any immediate prospect of one. Another winter as cold as the last does not seem likely.

In the absence of energy traumas, it is easy to forget. But the real energy crisis does not lie in intermittent supply interruptions or shortages during abnormally cold winters. These are simply dramatic symptoms of the underlying conditions of energy demand and supply that are worsening slowly, but inexorably, day by day.

This invisible crisis arises from the pressure of growing demand on finite resources of oil and natural gas. Over time, economic growth and increases in population add large increments to an already large base of consumption. However, the resources from which the demand must be satisfied are limited.

In the short run, the growing gap between consumption and domestic supply will have to be filled by increasing oil imports unless effective actions are taken to reduce demand and increase domestic supply. Import dependence produces economic and political vulnerability. The energy demand of other nations is also growing, and world oil production is likely to approach its capacity limitation in the near future. Thus, even if the United States were willing to accept the consequences of increasing dependence on imports, in the future the world's oil supply will no longer be able to satisfy growing American demand.

In the long term, research and development will provide supply options not available now. Until then, the basic task for the American people is to adjust energy consumption patterns to reduce pressure on domestic oil and gas resources and reduce oil imports. Thereby, the U.S. would be prepared for the transition to a different energy economy at the beginning of the next century.

U.S. ENERGY DEMAND

Econometric projections of supply and demand are made by Government and industry to analyze the impacts of different actions and policies. These projections are based on mathematical simulation of past behavior. As such, they fail to take into account the changing nature of public attitudes and tastes, institutional constraints, and many other factors. A mathematical model was used in the development of the National Energy Plan to provide one type of estimate of what would happen with and without the Plan. However, due to the inherent limitations of all models, care has been taken to set forth the uncertainties surrounding particular projections, and judgment has been exercised in order to provide the most reliable picture of America's energy future, both with and without the Plan.

The President's economic goals imply a 46 percent increase in gross national product (GNP) by 1985. Although there is no fixed relationship between energy and GNP, this growth does imply a substantial increase in energy consumption unless effective conservation measures are taken.

The model projects that, with a high rate of economic growth and no new conservation initiatives, total U.S. energy demand would grow between 1976 and 1985 at an average annual rate of 3 percent. Consumption would rise from the equivalent of 37 million barrels of oil per day in 1976 to more than 48 million by 1985, a 31 percent increase. Under favorable assumptions and with no new initiatives, domestic energy supply is projected to increase from the equivalent of 30 million barrels of oil per day in 1976 to 37 million in 1985. Thus, the overall gap between demand and domestic production would grow from 7 million barrels of oil equivalent per day to about 12 million.[1]

These projections could be unduly optimistic: they could understate demand and overstate domestic supply. If Americans disregard the energy crisis, demand could easily increase at a rate higher than projected; and experience suggests that domestic supply could easily be below the projected level.

Energy consumption is projected to grow at different rates in the three sectors of the economy from 1976 to 1985. The industrial sector's consumption of energy, 37 percent of the total in 1976, is projected to increase the most, by more than 5 percent per year. Residential and commercial demand, also 37 percent in 1976, is projected to increase at an average annual rate of about 2 percent. Transportation demand, 26 percent in 1976, is projected to increase at an average annual rate of 1 percent, assuming successful implementation of the present fuel efficiency standards and driver response to higher gasoline prices.

These projected growth rates are substantially different from those of the recent past. From 1950 to 1973, when energy consumption increased at an average annual rate of 3.5 percent, industrial use rose at a rate of only 3.0 percent; residential and commercial use grew at a rate of 4.3 percent; and use in the transportation sector grew at a rate of 3.4 percent. Since the 1973–74 embargo, energy use by industry has actually decreased, and energy use in the residential and commercial sector and the transportation sector has increased only slightly.

In addition to considering total demand and the demand of individual sectors, it is important to recognize that the various energy sources have different qualities and ranges of use and are more valuable in some uses than in others. Oil is heavily used by all three sectors, but is needed most for the transportation sector, where no substitute is currently available. Although natural gas is heavily used by industry, it is the premium fuel for residential and commercial use because it is an efficient, clean, and convenient source of heat. Coal is used principally by electric utilities and industry, and nuclear energy is suitable only for electricity generation. (Figure II–1 shows the fuels used by each sector.)

Substantial opportunities exist for reducing demand in all sectors. In the transportation sector, large savings can be achieved by improving the efficiency of automobiles and trucks. Sizable savings are also attainable in the industrial sector through more efficient processes and other energy-saving measures. With better insulation of homes and more efficient appliances, significant savings can be made in the residential sector.

OIL

Oil is the nation's major energy source, but neither domestic supplies nor imports from the rest of the world will be able to satisfy indefinitely continued high rates of growth.

Since World War II, U.S. oil consumption grew at an average annual rate of 4.4 percent until 1973. From 1969 to 1973, utilities and industrial users of coal responded to increased environmental concerns by converting to oil and natural gas. OPEC's fourfold increase in oil prices in 1973–74 created an immediate incentive for conservation. Consumption fell during the 1973–75 recession, but has now resumed its upward trend, and grew 6.7 percent in 1976.

Without further action, U.S. demand for oil will continue to increase in the future (see Figure II–2). Even taking into account various constraints, the mathematical model projects that demand will rise from 17.4 million barrels per day in 1976 to 22.8 million in 1985, a 3 percent annual increase. Without constraints, U.S. oil demand probably would grow at the postwar rate of 4 percent per year, and reach 25 million barrels per day by 1985.

Domestic oil supply cannot possibly meet that growing demand. Domestic oil reserves constitute only 3.7 percent of U.S. conventional energy reserves, but provided 27 percent of U.S. energy consumption in 1976. Current domestic production is 10 million barrels per day.[2]

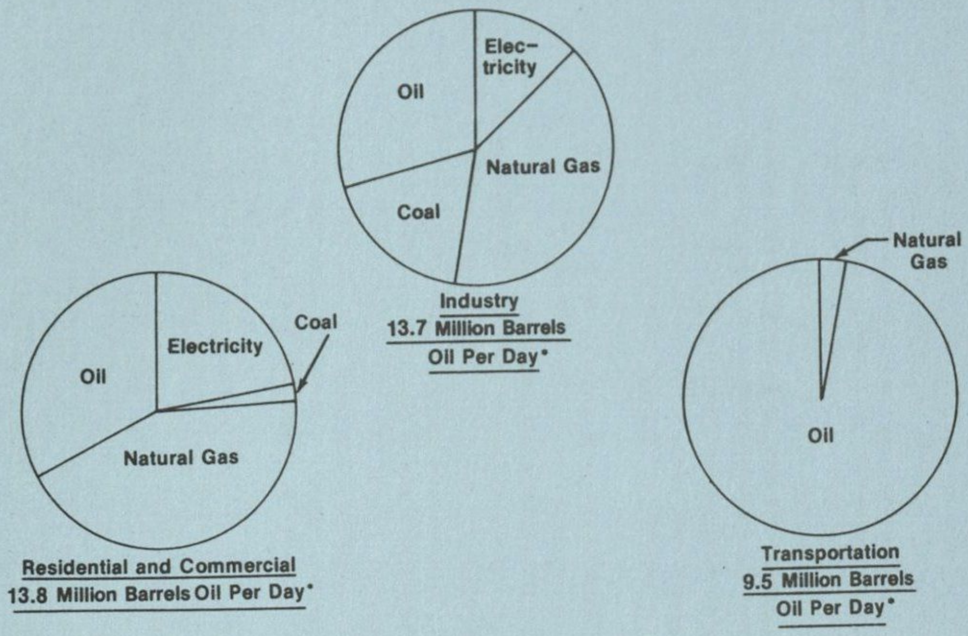
---

[1] The numbers do [illegible] add up due to rounding.

[2] Including natural gas liquids (NGL's) and refinery gains.

Goldman Sach Seminar May 1977
Background dope sucluas traffic projections

U.S. Energy Consumption By Sector, 1976

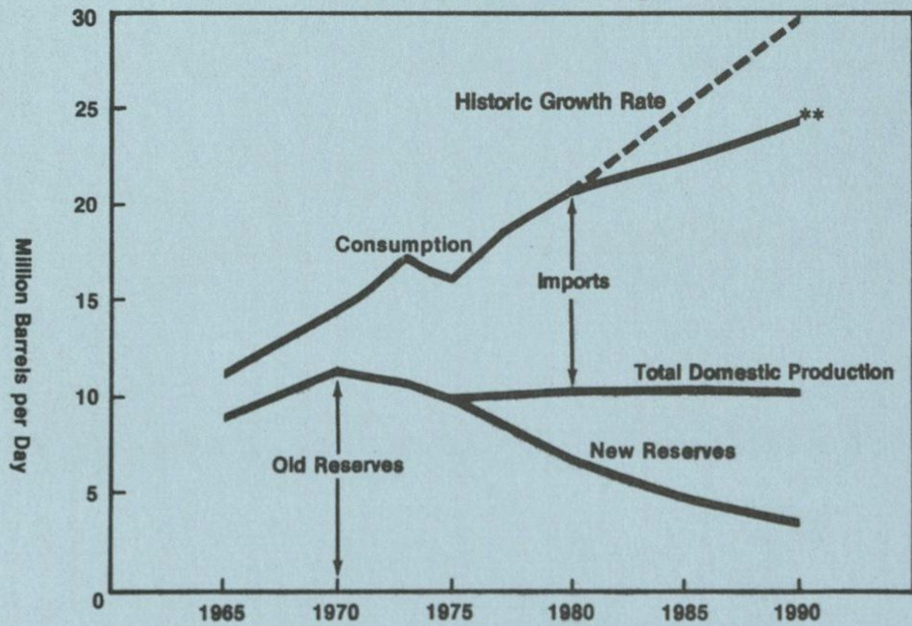


*Oil Equivalent
(Electricity Losses Allocated)

Source: Federal Energy Administration.

Figure II-1

U.S. Oil Consumption*
Without the National Energy Plan



* Includes Natural Gas Liquids

**assumes implementation of mandatory fuel efficiency standards and reductions induced by higher gasoline prices

Source: U.S. Bureau of Mines and Federal Energy Administration.

Figure II-2

With rising prices, the model projects total U.S. production of around 11 million barrels per day in 1985,[3] assuming a new contribution of about 3 million barrels per day from Alaskan oil, Outer Continental Shelf development, and tertiary recovery. Nevertheless, these new sources will be far from sufficient to satisfy the projected growth in U.S. demand.

Other major additions to domestic oil supply are unlikely. For more than 17 years, domestic oil discoveries have been outpaced by domestic consumption, except for the discovery of oil on the North Slope of Alaska. In 1940, U.S. proved reserves were sufficient for 14 years of consumption. Today, U.S. proved reserves amount to less than 10 years of production at the current level, which is only 5 years of current total domestic oil consumption. In the face of falling domestic oil reserves and production, oil companies increasingly engage in high-risk, high-cost development in such frontier areas as Alaska and the deep Outer Continental Shelf.

As a result of these postwar trends in demand and domestic supply, the United States has increasingly turned to imported oil. In 1947, the United States became a net importer of oil, but domestic excess production capacity exceeded the level of imports. By the mid-1960's, the United States had become dependent on imports: domestic excess capacity could no longer match the level of imports. Imports rose from 21 percent of U.S. oil consumption in 1965 to 37 percent in 1974. In 1976, imports averaged 7.3 million barrels per day, or 42 percent of U.S. oil consumption. In February of 1977, oil imports jumped to 9.6 million barrels per day. Increasing consumption of imported oil has led to deepening dependence on the world oil market and growing vulnerability to a supply interruption.

A major increase in imports will occur by 1985 unless demand is curbed. If demand for oil were to grow freely, it could reach 25 million barrels per day in 1985. Domestic oil production could well be only about 9 million barrels per day, 2 million below the model's projection. Oil imports would then be 16 million barrels per day. If current measures to increase fuel efficiency in automobiles are successful and if higher gasoline prices reduce driving, it is likely that demand for oil would be closer to 23 million barrels per day, and imports closer to 14 million. If, by 1985, demand were in fact 23 million barrels per day and domestic oil production were to increase by 1 million barrels per day, to 11 million, oil imports would then be 12 million barrels per day. Although estimates vary widely, the most reasonable range of estimates of 1985 oil imports is 12 to 16 million barrels per day.

Even apart from considerations of vulnerability, the United States cannot rely indefinitely on growing oil imports to meet its domestic deficit. In coming years, several factors will limit the availability of world oil for U.S. consumption. Ultimately, there are physical and economic limits on world oil resources. The approach to these limits will be hastened by increasing demand in other countries. During the 1980's, the oil-exporting countries will approach their capacity limitation.

The availability and cost of oil imports to the United States will be influenced by the rate of growth in demand for oil throughout the world. As the economies of other industrialized countries grow, their demand for world oil will increase. It is probable that, during the 1980's, demand for oil will outpace production in the Soviet Union and Eastern Europe, and their excess demand will aggravate the growing pressure on world oil supply. As developing countries make economic progress, they, too, will need additional oil. Iran, Venezuela, Nigeria, and other oil-exporting countries may well experience economic growth that will create substantial domestic demand for oil and cause them to limit exports, even if they maintain or increase production.

The oil-exporting countries probably will not be able to satisfy the increases in demand now projected to occur in the 1980's. In 1976, the 13 OPEC countries exported 29 million barrels of oil per day. If world demand continues to grow at the rates of recent years, by 1985 it could reach or exceed 50 million barrels per day. The United States alone, the most profligate of the world's energy users, would require a substantial part of that total. However, many OPEC countries cannot significantly increase production. In some, production will actually decline. Thus, as a practical matter, overall OPEC production could approach the expected level of world demand only if Saudi Arabia greatly increased its production. Even if Saudi Arabia did so, the highest levels of OPEC production probably would be inadequate to meet increasing world demand beyond the late 1980's or early 1990's.

Finally, there are physical and economic limits on the world's supply of oil. There is considerable uncertainty and debate about the size of the world's oil resources. A widely used geological estimate of total recoverable world oil resources, past and present, is about 2 trillion barrels. More than 360 billion barrels have already been consumed. Current proved crude reserves are 600 billion barrels. World demand for oil has grown at an average annual rate of 6.6 percent since 1940. It grew by as much as 8 percent annually during the 1960's. If it could be assumed that world demand for oil would grow at an annual rate of only 3 percent, and if it were possible (which it is not) that production would keep pace with that rate of growth, the world's estimated recoverable oil resources would be exhausted by 2020. At a conjectural growth rate of 5 percent, those resources would be exhausted by 2010.

In reality, world production would not continue to grow until the last drop was recovered. Rather, the growth of world consumption would be stopped by limitations on productive capacity. Despite the uncertainty about the exact size of recoverable world oil resources and about the rate of increase in productive capacity, this fundamental fact is clear: within about four generations, the bulk of the world's supply of oil, created over hundreds of millions of years, will have been substantially consumed.

---

[3] Including refinery gains.

Of course, actual physical exhaustion of oil resources will not occur. Even today, well over half the oil in existing wells is left in the ground because additional recovery would be too expensive. As production by conventional methods declines and oil becomes more scarce, its price will rise and more expensive recovery methods and novel technologies will be used to produce additional oil. As this process continues, the price of oil will become prohibitive for most energy uses. Eventually, the nations of the world will have to seek substitutes for oil for most energy uses, and oil will have to be reserved for petrochemical and other uses in which it has maximum value.

The world now consumes over 20 billion barrels of oil per year. To maintain *even that rate of consumption* and keep reserves intact, the world would have to discover another Kuwait or Iran roughly every 3 years, or another Texas or Alaska roughly every 6 months. Although some large discoveries will be made, the likelihood of a continuous flow of large discoveries is small. Indeed, recent experience suggests that, from the perspective of world oil consumption, future discoveries will be small or moderate in size, will occur in frontier areas, and will yield oil only at very high cost. Obviously, continued high rates of *growth* of oil consumption simply cannot be sustained.

NATURAL GAS

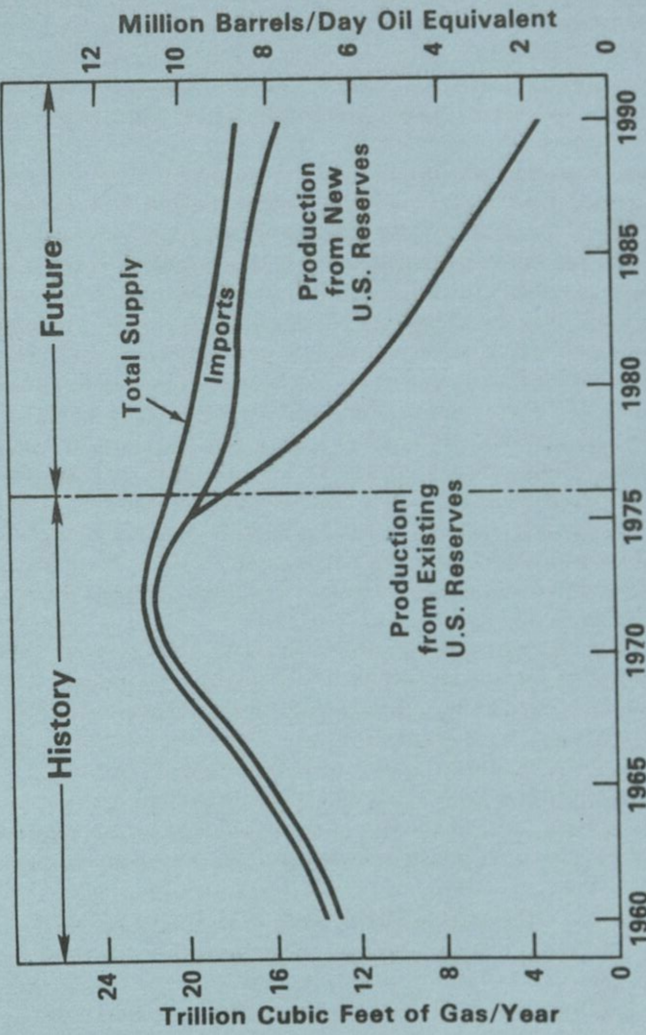
The opportunities for supplementing domestic production of natural gas with imports are small. It is far more expensive to transport gas overseas than oil. The presently available supplements to domestic natural gas are limited amounts of Canadian gas, imported liquefied natural gas (LNG), and synthetic natural gas (SNG). The availability of Canadian gas is becoming increasingly uncertain, and LNG and SNG are very expensive. Therefore, the growing imbalance between America's domestic natural gas resources and its annual consumption is of particular concern. (see Figure II–3.)

Natural gas constitutes only 4 percent of domestic conventional energy reserves. In 1973 it furnished 30 percent of U.S. energy consumption, the equivalent of about 11.2 million barrels of oil per day.[4] By 1976, its share had dropped to 27 percent, equivalent to 10 million barrels per day.

---

[4] Excluding natural gas liquids.

U.S. Gas Supply [1]



[1] does not include the effect of the National Energy Plan

Source: Federal Energy Administration.

Figure II-3

Goldman Sach Seminar May 1977
Background dope success traffic projections

Gas consumption grew by about 5.7 percent per year between 1960 and 1970. From 1970 to 1974, however, consumption declined by 1.3 percent, mainly because declining production caused prohibitions against the use of gas in new homes and buildings, and because industrial and electric utility users of interstate natural gas could not obtain adequate long-term commitments for new supplies.

Domestic production of gas, having peaked at 22.2 trillion cubic feet in 1973, has been declining. Last year, only 19.0 trillion cubic feet were produced.

Between 1976 and 1985, total U.S. production of natural gas is projected by the model to decrease from the equivalent of 9.5 million barrels of oil per day to 8.2 million barrels. Consumption, however, is projected to be the equivalent of 9.4 million barrels of oil per day. Consumption would increase to a much greater extent if supply were not limited. The difference between the estimated consumption and the estimated domestic production would be made up by imports, amounting to the equivalent of 1.2 million barrels of oil per day.

Federal regulation of the wellhead price of natural gas in interstate commerce has encouraged consumption of this premium fuel for nonessential uses and has discouraged its distribution from gas producing States to other States. Recent contract prices for new gas in the intrastate market range from $1.60 per Mcf to $2.25, while the highest price ever allowed for long-term interstate gas purchases is $1.45.

Last year, natural gas in the interstate market sold at wellhead rates that were 25 percent of the Btu equivalent price[5] of imported crude oil. At that price, natural gas was highly attractive to industry and utilities, and they used the equivalent of about 6 million barrels of oil per day, while new households had to turn to electricity.

Since Federal regulation covers only the interstate market, new onshore gas production has gone primarily to the unregulated intrastate market, where it has received higher prices. From 1973 to 1975, only 19 percent of new reserve additions were committed to the interstate market, and much of that gas was from the Federal domain. The existing distinction between intrastate and interstate sales has given intrastate users first claim on new natural gas.

By 1985, gas from existing reservoirs will be able to satisfy only 55 percent of natural gas demand. It is doubtful that even substantial price increases could do much more than arrest the decline in gas production.

The gap between demand and production in the lower 48 States will have to be filled from new sources, such as Alaskan gas; the Outer Continental Shelf; deeper, tighter onshore formations; the geopressurized zones along the Gulf Coast; synthetic natural gas; and imported liquefied natural gas. In the short term, the new sources of natural gas will not be able to reverse the downward trend in total U.S. production. Supplies for the residential and commercial sector will have to be obtained by diverting gas from electric utilities. However, from the mid-1980's onward, the prospects for gas supply could improve if significant discoveries are made on the Outer Continental Shelf, and if technological advances make possible the exploitation of the deeper, tighter onshore formations, Devonian shale, and geopressurized zones.

IMPLICATIONS FOR THE UNITED STATES

The United States would be profoundly affected by a continuation of current trends of oil and gas demand and supply. To sustain continuation of the rate of growth of demand, the U.S. would be forced to expand domestic production greatly or to increase its already high level of imports, or pursue a combination of both. These courses of action would present serious problems in the short run. But short-term impacts would be eclipsed by even greater problems if U.S. petroleum demand is still growing at the time OPEC production levels off.

Supply disruptions this winter caused short-term unemployment for more than 1 million workers nationally. They have also encouraged firms to consider moving plants, and jobs, to the Sun Belt to assure stable supplies of energy. But these near-term effects are minor compared to the loss of millions of jobs should future energy prices increase dramatically as a result of a continuing upward trend of demand combined with static or declining production.

The United States could face repeated jolts as energy supplies become increasingly unreliable and actual shortages occur more frequently. Regional disruptions could result from unusual weather, failure to bring electricity generating capacity on line, and many other factors. In some cases, the American people could experience mere inconvenience; in others, real suffering, as economic activity ground to a halt. It is difficult to predict which region would encounter problems and when, but future supply disruptions would be very likely.

Some industries, such as the recreation industry, are particularly dependent on a continuing supply of energy. Short-term limitations on energy use are disruptive to these industries. If action is taken now to curb demand, they will continue to flourish. If action is not taken, their very survival may come into question in the future.

A crash program to meet growing demand through increased domestic production would have very serious adverse consequences. Oil, the most critical energy resource, would be drained rapidly, and therefore the nation would not have adequate protection against future shortfalls in energy supply. It would be unwise to solve a problem of short-term vulnerability arising from dependence on oil imports by creating a problem of long-term vulnerability arising from depletion of America's resources.

---

[5] The Btu equivalent is the price paid for quantities of various energy sources that have the same heat value.

A production effort intended to eliminate oil and gas imports would also harm the environment. The Outer Continental Shelf, Alaska, oil shale, and synthetic fuels would have to be developed as rapidly as possible. Even more coal-fired and nuclear plants would be needed. Major energy production facilities would have to be developed without adequate attention to adverse impacts on public health, society and the environment.

The capital investment required to meet a domestic production level of 48 million barrels of oil equivalent per day by 1985 would exceed $550 billion, about 37 percent of total U.S. expenditures for all plant and equipment throughout the economy. In recent years, energy production has already been drawing a disproportionate share of capital. From 1973 through 1975, the United States invested $112 billion in plant and equipment to produce energy, about 35 percent of all such expenditures throughout the economy. Previously, the share of investment going to energy production had ranged between 25 and 30 percent.

Finally, an all-out production effort would raise questions of regional equity and balance. Actual and potential producing States would be pressed to deliver increasing quantities of energy at the expense of their environment and, in some areas, a distinctive way of life. Nonproducing States would be pressed to carry out increasingly drastic conservation programs.

If the United States pursued the course of accepting ever increasing imports, it would face a set of difficult problems. In the past, the United States has enjoyed flexibility in formulating and executing its foreign policy. If, however, the United States continues to increase its dependence on oil imports, its position as a world leader will be weakened. The current vulnerability to supply interruptions affects the whole structure of international relations. Although greater cooperation among the industrialized nations is needed to deal with the energy crisis, the crisis itself raises the specter of future competition among political allies for diminishing oil supplies. Because the United States is the country most wasteful of energy, and because it has been increasing its demand for world oil, the United States has not been able to provide leadership to restrain the growth of world demand.

Reliance on oil imports beyond the short term would also make the U.S. economy even more vulnerable to sudden large oil price increases.

Price vulnerability is as harmful to long-term economic and political interests as supply vulnerability. A precipitous increase in energy prices would place significant inflationary pressures on the economy.

The high level of oil imports has already increased the U.S. merchandise trade deficit from $2.0 billion in 1971 to $14.8 billion in 1976. In 1971, oil imports cost $3.7 billion; in 1976, they cost $36.4 billion.

The foregoing discussion addressed the most likely developments in U.S. energy demand and supply. The actual situation could be either better or worse. If growth in demand is reduced and significant new discoveries of oil are made, the leveling off and decline of world production would be deferred for a time.

However, one need not engage in fantasy to contemplate a far worse case. Under a set of unfavorable circumstances, U.S. payments for imported oil theoretically could run as high as $175 billion in 1985. Foreign oil producers might reduce exports to the United States or the world generally for their own economic or political reasons. Some producer nations might choose to conserve their remaining reserves rather than supply world demand. Moreover, a disruption of oil exports from the Persian Gulf would be a disaster for all oil-importing countries, including the United States.

The consequences would be grave if the United States were unable to purchase all the oil it needs. The United States would most likely experience a dramatic interruption of economic activity akin to a depression, and real income would plummet. Rationing and other Government controls would be necessary, leading to an unprecedented Government intrusion into the lives of American citizens.

In developing public policy toward the energy crisis, all three possibilities—the most likely case, the optimistic case, and the pessimistic case—should be considered. It would be foolhardy to base public policy on the most optimistic possibility. Even if the future should prove to be brighter than now appears likely, steps taken to curb demand and increase use of abundant resources would still have been justified to meet the immediate need to reduce vulnerability. In formulating public policy toward energy, the prudent course is to act on the basis of the most likely assumptions about the future, and to bear in mind that the pessimistic set of assumptions is a real possibility.

IMPLICATIONS FOR THE INTERNATIONAL COMMUNITY

Although the United States faces very serious problems, they are far less severe than those faced by most other nations. The 1973–74 embargo and fourfold increase in oil prices have already demonstrated the industrialized countries' vulnerability to arbitrary supply and

Goldman Sach Seminar May 1977
Background dope such as traffic projections

price manipulation. The industrialized nations continue to suffer from supply and price vulnerability, large and increasing balance of payment deficits, and resulting constraints on economic growth.

The dramatic 1973–74 OPEC price increases contributed significantly to the worst global recession since the Great Depression. Unemployment, for example, increased 4 percentage points in the U.S. In 1973, the OECD countries and the OPEC countries each had a small surplus in current account balances with the rest of the world, but in 1974 that situation was radically altered. The OECD countries experienced a $33 billion deficit on current account, while the OPEC surpluses increased to $70 billion. Since 1973, the oil-importing countries have paid over $300 billion in oil imports bills to the 13 OPEC countries. Today, each 10 percent price increase adds an additional $14 billion to the growing OPEC balances.

The massive oil price increases since 1973 have most adversely affected those developing countries that lack domestic oil supplies. Their expenditures for oil rose from about $4 billion in 1973 to $12 billion last year. The indirect cost to their economies was even more pronounced. The recession and inflation in the industrialized countries slackened their demand for the developing countries' exports, and raised the prices of the developing countries' imports. From 1973 to 1975 the foreign debt of these developing countries rose from $67 to $117 billion.

The developing nations cannot significantly reduce their energy consumption since they are not large energy users. As increasing amounts of scarce foreign exchange are expended for energy imports, other development needs suffer. Many developing countries have reached or even surpassed the limits of their creditworthiness.

The quadrupling of oil prices introduced a massive structural distortion into the international payments mechanism. That distortion has not abated. Debt service amounted to 15 percent of the world's export receipts in 1976. As a result, many countries are finding it more difficult to obtain additional loans from the commercial capital markets. The balances held by OPEC countries have been invested in the industrialized countries, largely in short-term securities, although a shift to longer-term investments is occurring. Most of these funds are invested in the United States and Europe, with only limited amounts flowing to the weaker developed and developing countries. Ironically, it is these very countries that suffer most from the energy crisis and have the greatest need for a compensating flow of capital.

The oil-exporting countries and the oil-importing countries share a number of long-term interests. Both need a growing global economy and a liberal trading system to ensure the availability of future markets for their products. All nations, including the oil exporters, will

someday have to meet their energy needs from resources other than oil and gas. Hence, all nations are part of the coming energy transition, even though they will be affected very differently.

* * *

The prognosis for the United States and the world is serious if current growth in demand for oil continues. In the short term, American vulnerability to a supply interruption would increase. By the mid-1980's, the United States could be vying for scarce oil against its allies and other consuming nations, including the Soviet Union. Then, prices could increase dramatically as a result of tremendous pressure on world oil supply.

During the last years of the 20th century, the United States will have to reduce significantly its reliance on oil, and make greater use of abundant energy sources. For the long term, the United States and other nations will need to develop renewable and essentially inexhaustible sources of energy. If steps are not taken now to prepare for this transition, the United States and the world will face serious economic and political problems.

Chapter III.—Principles and Strategy of the National Energy Plan

Broad public understanding of the gravity of the energy problem, a commitment to action, and a willingness to endure some sacrifice are all indispensable to the success of a national energy plan. In the present circumstances, an energy plan that demanded nothing from the American people would be no energy plan at all, but merely a prescription for chaos at a later date.

Changes in energy demand and supply have long leadtimes, and, therefore, the coming energy transition cannot be made overnight. For the transition to be made without serious economic and social disruptions, it will have to take place over a period of years. If the United States is to be prepared for the time when world oil production approaches its capacity limitation and then begins to level off, it must take action now.

The ultimate question is whether this society is willing to exercise the internal discipline to select and pursue a coherent set of policies well in advance of a threatened disaster. Western democracies have demonstrated such discipline in the past in reacting to immediate, palpable threats to survival, as in time of war. But they have had less success in harnessing their human and material resources to deal with less visible and immediate threats to their political and economic systems. When dangers appear incrementally and the day of reckoning seems far in the future, democratic political leaders have been reluctant to take decisive and perhaps unpopular action. But such action will be required to meet the energy crisis. If the nation continues to drift, it will do so in an increasingly perilous sea.

PRINCIPLES

The principles set forth in this chapter provide a framework not only for present policies, but also for development of future policies. Planning is necessarily an ongoing process. The National Energy Plan will have to be adjusted continually as new experience and knowledge are gained, as government programs take effect, as new technologies develop, and as the world's political and economic circumstances change.

The following 10 principles divide into two groups. The first five establish the context in which energy policy must be formulated. The

Goldman Sach Seminar May 1977
Background dope successes traffic projections

remaining five are fundamental to the proposed comprehensive National Energy Plan.

The first principle is that the energy problem can be effectively addressed only by a Government that accepts responsibility for dealing with it comprehensively, and by a public that understands its seriousness and is ready to make necessary sacrifices. The declining availability of oil and natural gas will affect virtually all energy prices and consumption patterns in the United States, for the various energy supplies are all part of an integrated energy market. Therefore, in this democratic society, a solution can be found only in comprehensive Government policy-making informed by public comment and supported by public understanding and action.

The Federal Government can pass laws and encourage action. State and local governments can play active roles. But this society can function at its best only when citizens voluntarily work together toward a commonly accepted goal. Washington can and must lead, but the nation's real energy policy will be made in every city, town and village in the country.

The second principle is that healthy economic growth must continue. It is an axiom of public policy that full employment be promoted. The energy problem can be solved without turning off or slowing down America's economic progress. In developing energy policy, measures should be designed to minimize adverse economic and fiscal consequences by returning to the economy funds collected to carry out energy policy. National energy policy can move toward economic rationality while protecting jobs, avoiding rampant inflation, and maintaining economic growth. Conservation initiatives, for example, not only contribute to productivity, but also create a large number of new jobs. Indeed, in the long run, the nation can continue to enjoy economic health only if it solves its energy problems.

The third principle is that national policies for the protection of the environment must be maintained. Energy policy should sustain and improve the quality of life of the American people. It would be ironic if, in moving toward that objective, the nation unnecessarily degraded the quality of the environment and made this country and the planet a less healthful place in which to live.

Virtually every available source of energy has its disadvantages. Storage and combustion of hydrocarbons can pollute the air. Oil imports and drilling on the Outer Continental Shelf present a risk of spills. Strip mining of coal scars the landscape, and deep mining causes deaths through accidents and black lung disease; coal combustion also presents risks to health; liquefied natural gas poses safety problems, as do light-water nuclear reactors. In energy planning, it is necessary to recognize hazards and risks and to reduce them to relatively low levels.

In the long run, there is no insurmountable conflict between the twin objectives of meeting energy needs and protecting the quality of the environment. The energy crisis and environmental pollution both arose from wasteful use of resources and economic and social policies based on the assumption of unlimited and cheap resources. The solutions to many energy and environmental problems follow a parallel course of improving efficiency and harnessing waste for productive purposes.

The fourth principle is that the United States must reduce its vulnerability to potentially devastating supply interruptions. Although conserving energy in general is an important goal, conserving oil has an even higher priority. Continued high vulnerabilty to interruptions of foreign oil supply is unacceptable.

Considerations of national security, as well as the problem of funding ever-increasing balance of payments deficits, suggest rejection of any "solution" to the energy problem through unrestrained growth of oil imports. Continued growth of imports would erode the nation's economic security, promote dissension with allies, and jeopardize America's world leadership. Moreover, the time is approaching when world oil production will no longer be able to supply the United States with increasing levels of imports.

The solution to the problem of vulnerability does not lie in a crash program of production to achieve energy independence. There is no justification for massive, reckless development of all U.S. energy resources, depletion of critical domestic oil and gas reserves, pollution of the environment, draconian conservation measures, and rejection of the substantial economic benefits of oil imports, all in the name of energy independence.

An appropriate and far more sensible goal is relative invulnerability. The United States should be prepared to import foreign oil for a number of years because it is an available source of supply that does not deplete domestic resources. Through effective conservation and increased use of abundant domestic resources such as coal, oil imports can be reduced to a manageable level. A large Strategic Petroleum Reserve, diversification of foreign sources of oil, and contingency plans should help to deter interruptions of foreign oil supply and protect the economy should an interruption occur.

The fifth principle is that the United States must solve its energy problems in a manner that is equitable to all regions, sectors, and income groups. No segment of the population should bear an unfair share of the total burden, and none should reap undue benefits from the nation's energy problems. In particular, the elderly, the poor, and those on fixed incomes should be protected from disproportionately adverse effects on their income. Energy is as necessary to life as food and shelter.

The energy industries need adequate incentives to develop new resources and are entitled to sufficient profits to encourage exploration and development of new finds. But they should not be allowed to reap large windfall profits as a result of circumstances not associated with either the marketplace or their risk-taking. The fourfold increase in world oil prices in 1973–74 and the policies of the oil-exporting countries should not be permitted to create unjustified profits for domestic producers at consumers' expense. By raising the world price of oil, the oil-exporting countries have increased the value of American oil in existing wells. National energy policy should capture that increase in value for the American people. However, where incentives are legitimately needed to stimulate new production, energy policy should allow adequate returns to producers. The distribution of the proceeds of higher prices among domestic producers and consumers must be equitable and economically efficient if the nation is to spread the costs fairly across the population and meet its energy goals.

Some regions of the country, particularly the Gulf Coast States and Appalachia, are large energy producers. Other regions, such as the Rocky Mountain and Great Plains States, have large energy resources which have not yet been extensively developed. And still other regions, such as New England and California, import most of their energy from other regions and other nations. The Plan must assure that policies are equitable across the country, and that the special needs of each region are met. Prices for energy should be reasonably uniform to prevent economic dislocations and unjustified variations in consumer costs.

The environmental quality of producing States and States with untapped resources should be protected by strict standards effectively enforced. Producing States should be fairly compensated, and consuming States should be assured a fair share of energy supplies at reasonable prices.

The Federal Government can enact national policies to further these goals, and can recognize that the States also have important responsibilities for the formulation and execution of energy policy. But States within the various regions must also accept their share of the responsibility for national equity if the U.S. is to avoid "energy Balkanization." It would be desirable for States to develop energy policies that complement the Plan while meeting local and regional needs.

The sixth principle, and the cornerstone of National Energy Policy, is that the growth of energy demand must be restrained through conservation and improved energy efficiency. Conservation and improvement in energy efficiency is the most practical course of action for the United States and for the nations of the world. Conservation is cheaper than production of new energy supplies, and is the most effective means for protection of the environment.

Conservation and improved efficiency can lead to quick results. A significant percentage of poorly insulated homes in the United States could be brought up to strict fuel efficiency standards in less time than it now takes to design, license, and build one nuclear powerplant.

Although conservation measures are inexpensive and clean compared with energy production, they do involve sacrifice and are sometimes difficult to implement. If automobiles are to be made lighter and less powerful, the American people must accept some sacrifice in comfort and horsepower. If industry is required to make energy-saving investments and to pay taxes on the use of scarce fuels, there will be some increases in the cost of consumer products. These sacrifices, however, need not result in major changes in the American way of life or in a reduced standard of living. Automobile fuel efficiency can be greatly improved through better design of cars, and thus gasoline consumption could be significantly reduced without inhibiting Americans' ability to travel. With improved energy efficiency, the impact of rising energy prices can be significantly moderated. Energy conservation, properly implemented, is fully compatible with economic growth, the development of new industries, and the creation of new jobs for American workers. Energy consumption need not be reduced in absolute terms; what is necessary is a slowing down in its rate of growth.

If a conservation program is instituted now, it can be carried out in a rational and orderly manner over a period of several years. It can be moderate in scope, and can apply primarily to capital goods, such as homes, automobiles, factories, equipment, and appliances. If, however, conservation is delayed until world oil production approaches its capacity limitation, it will have to be carried out hastily under emergency conditions. It will then be drastic; and, because there will not be time to wait for incremental changes in capital stock, conservation measures will have to cut much more deeply into patterns of behavior, disrupt the flow of goods and services, and reduce standards of living.

Finally, conservation in America can contribute to international stability by moderating the growing pressure on world oil resources. Indeed, reduction of America's demand for world oil would be a form of assistance to the developing countries.

The seventh principle underlying the National Energy Plan is that energy prices should generally reflect the true replacement cost of energy. Energy prices should move toward a level that reflects the true value of energy in order for market signals to work in harmony with conservation policy. When the cost of expensive foreign oil is averaged with cheaper domestic oil, consumers overuse oil. Government policy that promotes overuse by artificially holding down prices

Goldman Sach Seminar May 1977
Background dope sucks traffic projections

misleads consumers into believing that they can continue to obtain additional quantities of oil at less than its replacement cost.

Artificially low prices for particular energy sources also distort interfuel competition. The artificially low price of natural gas, for example, has encouraged its use by industry and electric utilities, which could use coal, and has made gas unavailable for new households, which could make better use of its premium qualities.

Neither Government policy nor market incentives can create additional oil or gas in the ground. But from a long-term perspective, prices are an important influence on production and use. As long as energy consumers are enticed into believing that they can continue to pay yesterday's prices for tomorrow's energy, they will continue to use more energy than the nation can really afford, U.S. resources will be rapidly exhausted, and continued overuse will make the inevitable transition more sudden and difficult.

Although producers need incentives for exploration and new development, pricing policies should not give them windfall profits unrelated to their economic contribution. If producers were to receive tomorrow's prices for yesterday's discoveries, there would be an inequitable transfer of income from the American people to the oil and gas producers, and producers' profits would be excessive.

The eighth principle is that both energy producers and consumers are entitled to reasonable certainty as to Government policy. An inadequately organized Federal Government, conflicting signals from different Federal agencies, and unwieldy and confusing regulatory procedures have resulted in major bottlenecks in the development of energy resources. The Plan should resolve a wide range of uncertainties that have impeded the orderly development of energy policy and projects. Some uncertainties are inherent in a market economy, and Government cannot and should not shelter industry from the normal risks of doing business. But Government can and should provide business and the public with a clear and consistent statement of its own policies, rules, and intentions, so that intelligent private investment decisions can be made. In order to be able to provide certainty and consistency in energy policy-making, the Federal energy agencies should be organized into a Department of Energy.

The ninth principle is that resources in plentiful supply must be used more widely, and the nation must begin the process of moderating its use of those in short supply. Although coal comprises 90 percent of domestic fossil fuel reserves, the United States meets only 18 percent of its energy needs from coal. Seventy-five percent of energy needs are met by oil and natural gas although they account for less than 8 percent of U.S. reserves. This imbalance between reserves and consumption should be corrected by shifting from oil and gas to coal and other domestic energy sources.

If the United States is to preserve its scarce reserves of oil and gas and still reduce the growth of imports, policies must be forged to reduce consumption of oil and gas, particularly by automobiles, industry, and electric utilities. As industry reduces its use of oil and gas, it will have to turn to coal and other fuels. The choices for electric utilities for the foreseeable future will be coal and nuclear power.

Expanding future use of coal will depend in large part on the introduction of new technologies that permit it to be burned in an environmentally acceptable manner, in both power plants and factories, for electricity, for process steam, and for heat. Efforts must also be made to perfect processes for low Btu gasification of coal and to develop new technologies for advanced high Btu gasification.

Light-water nuclear reactors, subject to strict regulation, can assist in meeting the nation's total net energy deficit. The 63 nuclear plants operating today provide approximately 10 percent of U.S. electricity, about 3 percent of total energy consumed. That contribution could be significantly increased. The currently projected growth rate of nuclear energy is substantially below prior expectations due mainly to the recent drop in demand for electricity, labor problems, equipment delays, health and safety problems, lack of a publicly accepted waste disposal program, and concern over nuclear proliferation. The Government should ensure that risks from nuclear power are kept as low as possible, and should also resolve problems and unnecessary delays in the nuclear licensing process.

To the extent that electricity from coal is substituted for oil and gas, the total amounts of energy used in the country will be somewhat larger due to the inherent inefficiency of electricity generation and distribution. But conserving scarce oil and natural gas is more important than saving coal.

The tenth principle is that the use of nonconventional sources of energy must be vigorously expanded. Relatively clean and inexhaustible sources of energy are a hopeful prospect, as supplements to conventional energy resources in this century, and as major sources of energy in the next. Many of these sources permit decentralized production, and thus provide alternatives to large, central systems. Traditional forecasts of energy use assume that nonconventional resources, such as solar and geothermal energy, will play only a minor role in the energy future. Unless positive and creative actions are taken by Government and the private sector, these forecasts will become self-fulfilling prophecies. Other technologies that increase efficiency of energy use, such as cogeneration of industrial process steam and electricity, should also be encouraged.

The Plan should not be premised on technological miracles. But nonconventional technologies are not mere curiosities. Steady technological progress is likely, breakthroughs are possible, and the estimated potential of nonconventional energy sources can be expected to improve. Many nonconventional technologies are already being used, and with encouragement their use will grow. Because nonconventional energy sources have great promise, the Government should take all reasonable steps to foster and develop them.

THE BROAD PERSPECTIVE

The U.S. has three overriding energy objectives. As an immediate objective, which will become even more important in the future, the U.S. must reduce its dependence on foreign oil to limit its vulnerability to supply interruptions. In the medium term, the U.S. must weather the stringency in world oil supply that will be caused by limitations on productive capacities. In the long term, the U.S. must have renewable and essentially inexhaustible sources of energy for sustained economic growth. The strategy of the Plan contains three major components to achieve these objectives.

First, by carrying out an effective conservation program in all sectors of energy use, through reform of utility rate structures, and by making energy prices reflect true replacement costs, the nation should reduce the annual rate of growth of demand to less than 2 percent. That reduction would help achieve both the immediate and the medium-term goals. It would reduce vulnerability and prepare the nation's stock of capital goods for the time when world oil production will approach capacity limitations.

Second, industries and utilities using oil and natural gas should convert to coal and other abundant fuels. Substitution of other fuels for oil and gas would reduce imports and make gas more widely available for household use. An effective conversion program would thus contribute to meeting both the immediate and the medium-term goals.

Third, the nation should pursue a vigorous research and development program to provide renewable and other resources to meet U.S. energy needs in the next century. The Federal Government should support a variety of energy alternatives in their early stages, and continue support through the development and demonstration stage for technologies that are technically, economically, and environmentally most promising.

The Plan seeks to achieve the overriding objectives by other means as well. To reduce vulnerability, the Strategic Petroleum Reserve should be expanded, foreign sources of oil should be diversified, and contingency plans should be put in place. To help weather the approaching capacity limitations on world oil production, incentives should be provided to encourage new production in Alaska, on the Outer Continental Shelf, and from advanced recovery techniques. Potential new sources of gas hold great promise and should be developed.

Conversion from oil and gas to coal should be facilitated by development of more environmentally acceptable methods for using coal.

The 10 principles of the National Energy Plan provide a realistic framework for these actions. By pursuing conservation, bringing energy prices into line with replacement costs, and expanding the use of coal, the U.S. can reduce oil imports to an acceptable level and prepare for the coming stringency in oil supplies. Backed by a large Strategic Petroleum Reserve, a more diversified set of foreign oil suppliers, and contingency plans, the United States can reduce its vulnerability to supply interruptions to an acceptable level. Measures can be designed to assure that American workers, the poor, and the elderly do not suffer as a result of rising prices. Economic growth can be promoted and inflationary pressures kept within bounds. Regional and environmental imbalances can be recognized and corrected with maximum equity. And nonconventional sources of energy can be promoted to meet long-term needs.

The United States is at a turning point. It can choose, through piecemeal programs and policies, to continue the current state of drift. That course would require no hard decisions, no immediate sacrifices, and no adjustment to the new energy realities. That course may, for the moment, seem attractive. But, with each passing day, the nation falls farther behind in solving its energy problems. Consequently, its economic and foreign policy position weakens, its options dwindle, and the ultimate transition to stringency in oil supplies and higher oil prices becomes more difficult.

An alternative to continued drift is the comprehensive National Energy Plan, set forth in the next five chapters. Chapter IV describes the Plan's conservation and fuel efficiency program. Chapter V contains proposals for the pricing of oil and natural gas and for resolving other issues affecting those resources. Chapter VI presents the Plan's program for conversion to coal and other fuels, and its programs for nuclear and hydroelectric power. Chapter VII presents initiatives for the development of nonconventional resources and sets forth the Administration's policy toward energy research and development. Chapter VIII addresses the role of government and the public in formulating and carrying out energy policy. It discusses, in particular, the establishment of national energy goals, the creation of the Department of Energy, the development of a national energy information system, competition within the energy industries, the role of the States, assistance to people with low incomes, and public participation. Finally, Chapter IX discusses the impacts of the Plan.

Goldman Sach Seminar May 1977
Background dope sucess traffic projections

CHAPTER IV–THE NATIONAL ENERGY PLAN: CONSERVATION AND ENERGY EFFICIENCY

The cornerstone of the National Energy Plan is conservation, the cleanest and cheapest source of new energy supply. Wasted energy—in cars, homes, commercial buildings and factories—is greater than the total amount of oil imports. By reducing the need for additional oil imports, conservation and improved efficiency in the use of energy can contribute to national security and international stability. By reducing the need for additional domestic energy production, conservation can contribute to environmental protection and to an adequate supply of capital for balanced economic growth.

America needs to embrace the conservation ethic. The attitudes and habits developed during the era of abundant, cheap energy are no longer appropriate in an era of declining supplies of America's predominant energy sources. Conservation offers vast opportunities for American creativity and know-how. The challenge of saving energy should galvanize the ingenuity and talents of the American people. As individual Americans find new ways to save energy in their daily lives, they will reduce their own energy bills and contribute to the future well-being of the country.

In buying durable goods, in deciding how to travel to work or how to spend leisure time, and in making countless other decisions, Americans will have to be conscious of the rising price of energy, and will have to emulate the shrewdness and practicality of earlier generations. For example, when buying a home, a car, or an appliance, consumers ought to consider not only an item's initial cost, but also its annual operating cost—including its energy consumption. In many cases, an item that is initially more expensive will actually prove to be cheaper over a period of years.

If vigorous conservation measures are not undertaken and present trends continue, energy demand is projected to increase by more than 30 percent between now and 1985. Americans can eliminate energy waste through effective conservation and improved energy efficiency in transportation, buildings, and industry.

TRANSPORTATION

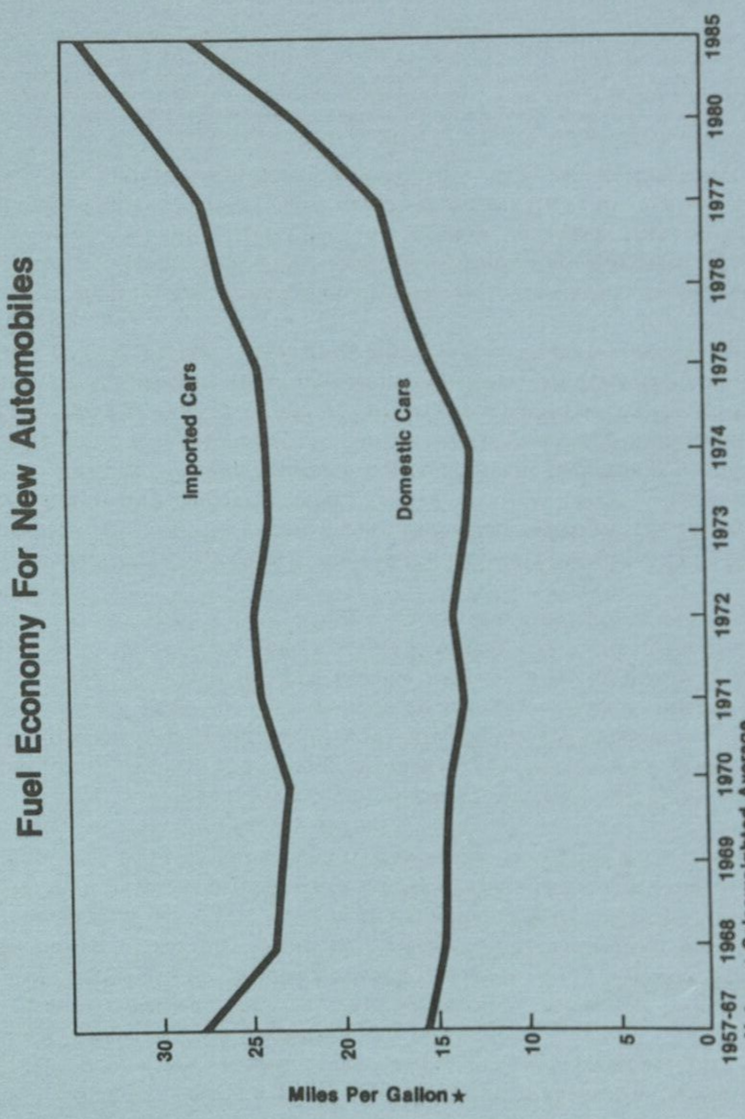
Transportation consumes 26 percent of U.S. energy, and about half of that is used by automobiles. About 5 million barrels of oil per day are consumed by automobiles. Domestically manufactured automobiles use considerably more gasoline than imported cars. (See Figure IV–1.) More efficient, lighter, and less powerful cars would save a substantial amount of gasoline. Carpooling could also save significant quantities of gasoline. If 4 commuting cars out of 10 carried 1 additional passenger, 2.5 percent of total oil consumption, about 400,000 barrels per day, could be saved. No serious energy policy can ignore these opportunities for large savings.

Overseas, there is no greater symbol of American energy waste than the heavy, powerful, accessory-laden American automobile. An average new car in Europe weighs about 1,900 pounds; in the United States, about 3,300. From the perspective of energy efficiency, a major problem with American cars is their weight and power, not necessarily their interior size. With better design and other improvements, family size cars could be considerably more fuel efficient.

In late 1975, the Congress enacted legislation requiring that the average mileage of new cars be 20 miles per gallon by 1980, and 27.5 miles per gallon by 1985, compared to 14 miles per gallon actually achieved in 1974. However, many consumers still appear to prefer heavier cars with high acceleration and low fuel efficiency. It is questionable whether the penalties for noncompliance by manufacturers are strong enough to assure that the current statutory standards will be met. The present legislation is, therefore, insufficient to ensure the kind of reductions that are needed in the transportation sector. Reduction in gasoline consumption is necessary. Accordingly, the Plan proposes a national goal to reduce gasoline consumption 10 percent by 1985.

To help achieve that goal, a graduated excise tax would be imposed on new automobiles with fuel efficiency below the fleet average levels required under current legislation. Graduated rebates would be given for new cars with mileage better than the standard. The tax schedule would be fixed by statute, and taxes would rise from 1978 to 1985 and remain constant thereafter. The rebate schedule would be set by the Internal Revenue Service so that total estimated rebate payments would be equal to estimated tax receipts, with no gain or loss to the Treasury. The rebate schedule would be fixed in advance so that manufacturers and consumers would know the exact amount of tax or rebate for every car. Rebates would be available for cars purchased after May 1, 1977. These rebates would be paid from taxes collected on 1978 fuel inefficient vehicles.

Examples for the model year 1985 illustrate the operation of the tax-rebate system. In that year the statutory standard will be 27.5 miles per gallon. A car with at least 20.5 miles per gallon but less than 21.5 would bear a tax of $610; and a car with less than 12.5 miles per



Note: ★ Salesweighted Average

Source: Environmental Protection Agency and Federal Energy Administration.

Figure IV-1

Goldman Sach Seminar May 1977
Background dope such as traffic projections

gallon would bear a tax of $2,488, the maximum under the proposed system. In the same year, a car with 30.5 miles per gallon would earn a rebate of $176; a car with 34.5 miles per gallon would earn a rebate of $362; and a car with 38.5 miles per gallon or above would earn a rebate of $493. The statutory maximum would be $500. Actual rebates might differ from these estimates, depending on the estimate that will be made in 1984 of the composition of new car sales during the 1985 model year, and the tax receipts that would result from that composition.

Cars manufactured in the United States or Canada would be eligible for rebates; for cars manufactured in other countries, rebates would be provided only after agreements were reached with individual countries. The President's Special Representative for Trade Negotiations will work with other nations to develop equitable rebate agreements.

Electric vehicles would be eligible for the maximum rebate. These vehicles consume no gasoline and are a clean method of transportation for intra-urban use. Electric delivery trucks have long been used in Europe.

The Administration intends to continue the progress that has been made to date on automobile fuel efficiency. The Secretary of Transportation will begin the analytic work necessary to examine how his authority should be used to raise mileage standards above 27.5 miles per gallon beyond 1985.

The tax on fuel inefficient new cars will not reach old cars, and it will not directly influence the number of miles driven. A further measure is necessary to help meet the goal of a 10 percent reduction in gasoline consumption by 1985. Accordingly, a program is proposed to establish annual targets for gasoline consumption, backed by a standby tax on gasoline.

A gasoline tax is a highly effective measure for conservation because it affects all cars and all drivers. However, in order to provide maximum scope for citizen action, the tax would not be imposed as long as Americans achieved specified annual gasoline consumption targets. The proposal would challenge the American people to reduce gasoline consumption through use of more efficient cars, increased use of car pools and van pools, compliance with the 55-miles-per-hour speed limit, more efficient driving, regular maintenance, and reduced use of cars. If the American people join together to meet this challenge, the standby tax will never take effect.

The targets established in the standby tax program would permit limited annual increases in gasoline consumption from 7.35 million barrels per day in 1978 to 7.45 million in 1980. From 1980 to 1987, when fuel-efficient cars will become a sizable share of the total automobile fleet, the program would require annual reductions in gasoline consumption. The target in 1985 would be 6.60 million barrels per day.

Under the program, no tax could go into effect until 1979. In 1979 or any subsequent year, the tax would go into effect if gasoline consumption in the preceding year exceeded the target by at least 1 percent. The amount of the tax would equal 5 cents for each percent that gasoline consumption exceeded the target in the preceding year. The tax could be reduced by 5 cents a year based on the formula in the legislation. The tax could not increase or decrease more than 5 cents per year and it could never exceed 50 cents.[1]

Funds collected from the standby gasoline tax would be rebated progressively to the public. For each five cents of tax imposed, nearly $6 billion in revenue would be generated. These revenues would be rebated on a per capita basis in the amount of $25 to each person per year or a payment of $100 for a family of four. If a tax of twenty-five cents were to be imposed, each citizen would be eligible for a payment of $125, or $500 for a family of four.

Passenger automobiles are not the only wasteful vehicles. Under the Energy Policy and Conservation Act, the Secretary of Transportation plans to promulgate by next July efficiency standards for light-duty trucks weighing 6,000 pounds or less. Once those standards are in effect, these vehicles will become subject to a tax-rebate system similar to that for automobiles. The President has directed the Secretary to commence a proceeding to cover trucks weighing over 6,000 pounds.

Legislation is requested to remove the 10 percent excise tax on inter-city buses. Buses, like railroads, are fuel-efficient forms of transportation that deserve encouragement.

The existing Federal gasoline tax on aviation fuel would be raised to 11 cents per gallon except for use by commercial airlines and in farming. The current rebate of half of the Federal excise tax on fuel used by motorboats would be eliminated. Revenues from the elimination of that rebate would go to the Land and Water Conservation Fund.

The Federal Government itself must set an example in reducing gasoline consumption. The President is issuing an Executive Order requiring that the Federal fleet of new cars meet an average mileage standard that will rise from 2 miles per gallon above the average fuel economy standard applicable in 1978 to 4 miles per gallon above in

---

[1] The tax would increase if an annual target is exceeded and would decrease if an annual target is met. For example, if standby tax legislation is enacted in 1977, the first target would be for 1978. If the target is exceeded by 0.5 percent in 1978, no tax would go into effect for 1979, because the tax is triggered only by an excess of at least 1 percent. If the 1979 target is exceeded by 10 percent, a 5-cents-per-gallon tax would go into effect for 1980; regardless of the amount of excess, no increase in the tax can be more than 5 cents for any year. If the 1980 target is exceeded by 1 percent, the 5-cents-per-gallon tax would remain in effect without any increase because the tax can reach 10 cents per gallon only if the excess in the previous year was at least 2 percent. If the 1981 target is exceeded by 2 percent, the tax would increase to 10 cents per gallon for 1982. If in 1982 consumption is 25 percent below the target, the tax for 1983 would decrease from 10 cents per gallon to 5 cents per gallon. No decrease in the tax can be r[illegible] than 5 cents per gallon for any year.

1980 and thereafter. This initiative not only will save gasoline, but also will provide incentives for the development of more fuel-efficient vehicles.

The Federal Government will also initiate a major van pooling demonstration program in areas not served by mass transit. About 6,000 vans will be purchased by the Federal Government and made available to Federal employees. All costs of the program will be repaid to the Federal Government by the riders.

If it should appear that the goal of a 10 percent reduction in gasoline consumption by 1985 is not being achieved, additional measures, including a tax on commuter parking and minimum automobile mileage standards, would have to be considered.

Beyond this Federal program, States and localities can promote gasoline conservation through local initiatives. Observance of the national 55-miles-per-hour speed limit should be vigorously enforced by States and municipalities. The Secretary of Transportation has authority to withhold Highway Trust Fund revenues from States not enforcing the 55-miles-per-hour speed limit. If the widespread noncompliance and lack of enforcement continue, the Secretary may find it necessary to exercise that authority.

Inspection and maintenance programs to determine compliance with the Clean Air Act can also provide gasoline savings. In areas where air quality indicates a need for inspection and maintenance, gasoline savings of 2 percent can be achieved.

Reduction in gasoline consumption will entail a loss of revenues to the States from their taxes on gasoline, which are used to operate and maintain highways. A way needs to be found to ease this additional burden on State treasuries. The Administration will develop a program to compensate them for this loss though sources such as the Highway Trust Fund.

In the long run, mass transit by bus and rail must play a significant role in reducing energy consumption in the transportation sector. Reliable, inexpensive mass transit is needed to serve existing, spread out metropolitan areas. New development patterns based on public transportation can bring homes and offices, churches and schools, shops and other community buildings together, and at the same time conserve energy. The nation must begin to explore a system of incentives for more efficient transportation just as it is creating disincentives for inefficient transportation.

BUILDINGS

Currently, there are approximately 74 million residential units in the United States, and 1.5 million nonresidential buildings with some 29 billion square feet of floor space. Almost 20 percent of U.S. energy

is used to heat and cool buildings. Some of these buildings needlessly waste as much as half of that energy. The hermetically-sealed glass and steel skyscraper is the analogue of the gas-guzzling automobile. The energy inefficiency of American buildings is a direct result of the cheap energy era in which most of these structures were built.

The potential savings from improving the energy efficiency of the nation's stock of buildings are enormous. Installation of ceiling and roof insulation, weatherstripping of doors and windows, caulking of cracks, installation of clock thermostats, and simple furnace modifications could result in substantial energy savings.

The Plan includes a national program designed to bring 90 percent of all residences and many public and other buildings up to minimum Federal standards by 1985. The program contains the following elements:

First, homeowners would be entitled to a tax credit of 25 percent of the first $800 and 15 percent of the next $1,400 spent on approved conservation measures. The credits would be available for measures undertaken between April 20, 1977, and December 31, 1984. A list of eligible measures will be included in proposed legislation.

Second, State public utility commissions would be required to direct their regulated utilities to offer their residential customers a "turnkey" conservation service, financed by loans repaid through monthly bills. Utilities would also inform customers of other available conservation programs, and advise them how to obtain financing, materials, and labor to carry out conservation measures themselves. Other fuel suppliers will be encouraged to offer similar programs, with the help of State energy offices.

Third, the Federal Government will remove the barriers to opening a secondary market for residential energy conservation loans through the Federal Home Loan Mortgage Corporation and the Federal National Mortgage Association. This action should help to ensure that capital is available to homeowners at reasonable interest rates for residential energy conservation through private lending institutions.

Fourth, increased funds would be available to aid people with low incomes to weatherize their homes. Under this proposal, $130 million would be provided in fiscal 1978, $200 million in 1979, and $200 million in fiscal year 1980. The Secretary of Labor has been directed to take all appropriate steps to ensure that recipients of funds under the Comprehensive Employment Training Act (CETA) will supply labor for the weatherization effort. The CETA program's employment levels, as proposed by the Administration, would meet the labor requirements of the low-income weatherization program.

Fifth, the Department of Agriculture has begun a rural home conservation program in cooperation with rural electric cooperatives with loans provided through the Farmers Home Administration.

Goldman Sach Seminar May 1977
Background dope suchas traffic projections

Sixth, businesses would be entitled to a 10 percent tax credit for investments in approved conservation measures, in addition to the existing investment tax credits. A list of approved measures would be included in the legislation. The credit would be available to owners of apartment buildings, and tenants should benefit from the impact of reduced energy costs on rents.

Seventh, a Federal grant program would assist public and nonprofit institutions such as schools and hospitals in conservation. The program would be funded at the rate of $300 million per year for 3 years.

Eighth, the Local Public Works Program, under which the Federal Government provides funds for public works projects for State and local government units, will include repair of State and local government buildings. The Department of Commerce, which administers the program, will strongly encourage State and local governments to include in their proposals actions that will contribute to energy conservation.

Except for participation by electric and gas utilities, the proposed national program is a voluntary one. It does not initially include any intervention by the Federal Government into the homes of individual Americans. The American people already have ample incentives for improving the energy efficiency of their homes. Home heating and cooling bills have risen dramatically in recent years, and the prices for all fuels used in home heating and cooling will rise even more in the future. The program provides the means for carrying out conservation measures: tax credits, federally encouraged loans, and the assistance of utilities. If, however, the present reliance on voluntary measures is insufficient to achieve widespread residential energy conservation, then mandatory measures will be considered, such as a requirement that homes be insulated before they are sold.

New buildings should also be energy efficient. The President is directing the Department of Housing and Urban Development to advance by 1 year, from 1981 to 1980, the effective date of the mandatory standards required by the Energy Policy and Conservation Act. Funds will be made available to States to help them in this effort.

The President is issuing an Executive Order to upgrade the efficiency of Federal buildings. He is directing all Federal agencies to adopt procedures which aim at reducing energy use per square foot by 1985 by 20 percent from 1975 energy consumption levels for existing Federal buildings and by 45 percent for new Federal buildings. Investments which are not cost-effective would not be funded under the program. The Director of the Office of Management and Budget and the Administrator of the Federal Energy Administration will implement this program.

Finally, the Administration will request appropriations of up to $100 million over the next 3 years to add solar hot water and space heating to suitable Federal buildings to reduce consumption of conventional fuels and demonstrate the feasibility of widespread solar energy use.

APPLIANCES

Major home appliances such as furnaces, air-conditioners, water heaters, and refrigerators account for 20 percent of the nation's energy consumption.[2] Most of these appliances could achieve significant reductions in energy use with relatively small increases in cost. Current legislation relies mainly on voluntary efforts to meet industry-wide average targets, and permits the establishment of mandatory standards only after long delays. New legislation is proposed to streamline the regulatory process. The present voluntary program will be replaced by mandatory minimum standards on certain major home appliances as soon as possible. The National Bureau of Standards will continue to develop procedures to test the energy efficiency of appliances. The Federal Energy Administration will continue to promulgate test procedures. The Federal Trade Commission will establish labeling requirements.

FUEL EFFICIENCY IN INDUSTRY

Industry accounts for 37 percent of the nation's energy consumption. Since the 1973–74 oil supply interruption, industry has done better than other sectors in conserving energy, but still has a large potential for further savings. For example, various U.S. industries are substantially less fuel efficient than their West German counterparts. (See Figure IV–2.) Industrial firms have an incentive to make energy-saving investments that are cost-effective from their own perspective. The price industry pays for much of the energy it consumes is not the marginal cost of energy, but rather a "rolled in" average cost, and often industrial firms receive volume discounts. In many cases, energy costs are small relative to the first costs of energy-saving investments. Therefore, energy-saving investments frequently have a lower value to industry than to society.

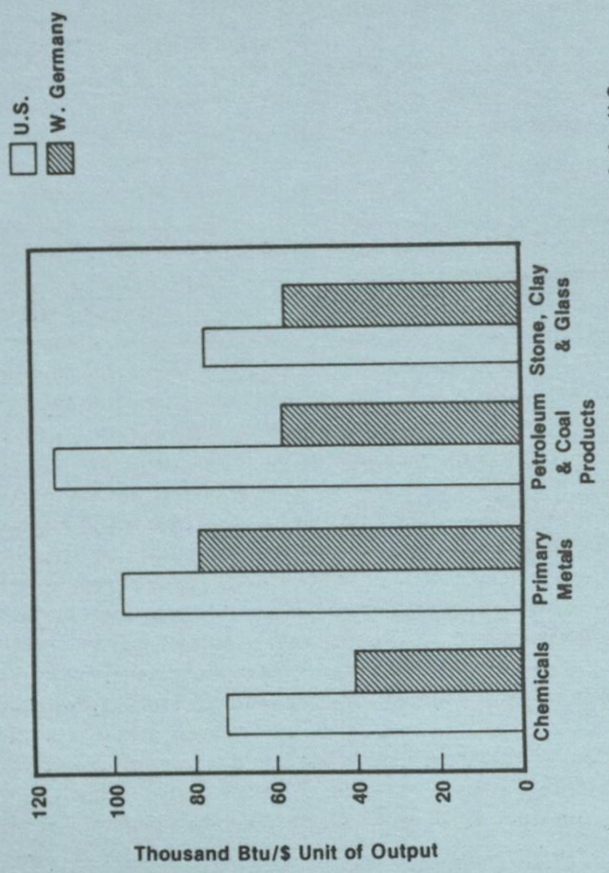
The oil and gas pricing program, described in Chapter V, and the taxes on industrial and utility use of oil and gas, described in Chapter VI, would provide substantial improvement in overall industrial energy efficiency.

To achieve greater savings within the industrial sector, an additional 10 percent investment tax credit would generally be available

---

[2] This figure includes the heating and cooling of buildings.

U.S. Industry Energy Efficiency Compared to West Germany, for Major Energy-Intensive Industries



Source: Comparison of Energy Consumption Between W. Germany & the U.S., Stanford Research Inst., June 1975.

Figure IV-2

for investments in energy-saving equipment, including ar energy systems. A list of types of eligible investments would be included in the legislation. The Secretary of the Treasury would have authority to add items to the list and to delete items that do not effectively conserve energy after consultation with the Administrator of the Federal Energy Administration.

COGENERATION AND DISTRICT HEATING

About three-quarters of the energy used by industry actually performs useful work; the rest is waste heat. In addition, two-thirds of the energy used in electricity generation and distribution is wasted. In 1975, waste heat from these sources was equivalent to over 7 million barrels of oil per day.

One way to use this waste heat is through cogeneration, the simultaneous production of process steam and electricity. Cogeneration provided 15 percent of U.S. energy as recently as 1950, but now contributes only 4 percent.

Although cogeneration is economical today and will become increasingly attractive as energy prices rise, a variety of institutional barriers impede its development. A program is proposed to remove these barriers by assuring that industrial firms generating electricity receive fair rates from utilities for both the surplus power they would sell and for the backup power they would buy. Industries using cogeneration to produce electricity could be exempted from State and Federal public utility regulation, and would be entitled to use public utility transmission facilities to sell surplus power and buy backup power. An additional tax credit of 10 percent above the existing investment tax credit would be provided for industrial and utility cogeneraton equipment. Finally, industrial firms and utilities which invest in cogeneration equipment could be exempted from the requirement to convert from oil and gas in cases where an exemption is necessary for cogeneration. Cogeneration would reduce the capital requirements of electric utilities.

Another productive use of waste heat which should be fully explored is district heating. State public utility commissions should give close attention to this option in their processing of applications for new utility generating capacity.

The Government proposes to demonstrate a commitment to district heating by funding in fiscal 1978 a program to make use of the large quantities of waste heat generated by facilities of the Energy Research and Development Administration. ERDA would recover the waste heat for use on site and would also pipe steam and hot water to nearby households, industry, and agriculture. After a study of the feasibility of this concept, actual implementation of the program could occur at ERDA's facilities at Oak Ridge, Tennessee; Paducah, Kentucky; Portsmouth, Ohio; and Savannah River, South Carolina.

Goldman Sach Seminar May 1977
Background dope succes traffic projections

The Plan seeks to achieve the large savings available from productive use of waste heat through positive incentives. Careful review will be made of progress in the use of waste heat. If industry and utilities do not respond adequately, consideration will be given to a tax on waste heat or other direct measures to reduce this loss of energy.

UTILITY REFORM

Conventional utility pricing policies discourage conservation. The smallest users commonly pay the highest unit price due to practices such as declining block rates. Rates often do not reflect the costs imposed on society by the actions of utility consumers. The result is waste and inequity.

Electrical energy is difficult and expensive to store, so a utility's need for plant and equipment is determined by its peak demand. If electricity consumption during peak periods were reduced, fewer costly new additions to utility capacity would be needed. Equally important, since peaking units commonly burn oil and gas, a reduction in peak demand would save these scarce fuels.

Accordingly, comprehensive utility reform legislation is proposed. State public utility commissions would require their regulated utilities to reform rate structures in the interest of conservation and equity. Such reform would be a prerequisite to future rate increases. The program includes the following elements:

—Electric utilities would be required to phase out promotional, declining block, and other rates that do not reflect costs; gas utilities would also be required to phase out declining block rates.

—Electric utilities would be required to offer either daily off-peak rates to each customer who is willing to pay metering costs, or provide a direct load management system. Off-peak rates would provide a strong incentive for customers, particularly industrial customers, to shift energy use from peak to off-peak periods. Similarly, homeowners would have an incentive to wash dishes and clothes at night when rates were lower, or to install equipment that stores energy during off-peak hours for use during peak hours.

—Electric utilities would be required to offer lower rates to customers who are willing to have their power interrupted at times of highest peak demand.

—Master metering—the use of a single meter for multi-unit buildings or complexes—would generally be prohibited in new structures. Individual metering induces energy conservation, in some cases as much as 30 percent.

—Electric utilities would be prohibited from discriminating against solar and other renewable energy sources.

—the Federal Government would be authorized to adopt, and require implementation of, similar policies applicable to gas utilities.

Utility interconnections and power pools make possible economies of scale, reduction of aggregate capacity requirements, and sharing of power during emergencies. Expansion of interconnections and achievement of maximum efficiency from pools are primarily the responsibility of the utility sector, which has been active in this area.

The Federal Government will follow closely the further progress of the utility sector. A proposed amendment to the Federal Power Act would remove a major gap in the authority of the Federal Power Commission by authorizing it to require interconnections between utilities even if they are not presently under FPC jurisdiction. The FPC would also be authorized to require wheeling the transmission of power between two noncontiguous utilities across another utility's system.

SAVINGS FROM CONSERVATION

Many conservation measures can be implemented with relatively little cost. Conservation involves sacrifice mainly where a cherished prerogative is given up. Many American drivers have come to enjoy instant acceleration, but as oil becomes increasingly scarce, the highly powered automobile will become increasingly anachronistic. Some moderate sacrifice today will help avoid major jolts and far more painful sacrifices in the future.

There are many ways that individual Americans can save energy beyond those specific measures included in the National Energy Plan. Individuals can keep their homes at 78° F. during the summer and at 65° F. during the winter. They can walk or ride bicycles or join carpools, instead of driving alone. They can combine several shopping trips into one. And, they can maintain their energy-using equipment—furnace, car, appliances—in good operating condition, so as to reduce energy waste.

The value of the proposed conservation program can be illustrated by comparing the cost of savings from conservation with the cost of oil imports. Conservation reduces the need for imported oil costing about $13.50 per barrel through investment in insulation, lighter automobiles, clock thermostats, and other capital equipment. The costs of the capital equipment can be expressed in terms of the cost of each barrel of oil equivalent which the equipment saves. The resulting costs vary. For example, the effective cost of a barrel of oil equivalent saved under some of the Plan's proposed conservation measures are: less than $2 for cogeneration; $3.50 for mandatory standards for new commercial construction; and about $7.50 for tax credits for commercial and industrial investments in energy-saving retrofits or mandatory standards for new residential construction. In short, conservation pays.

Goldman Sach Seminar May 1977
Background dope such as traffic projections

Chapter V.–The National Energy Plan: Oil and Natural Gas

Oil and natural gas are currently the nation's primary energy sources. They provide three-quarters of U.S. energy consumption, but constitute less than 8 percent of domestic reserves. National policy toward oil and gas has been erratic, complex, and ineffective. Continuing uncertainties, particularly as to price, have retarded both production and conservation investment. The United States needs a clearly defined oil and gas policy that provides both producer incentives and consumer protection.

THE CONTEXT OF OIL AND NATURAL GAS PRICING

Both oil and natural gas are now priced domestically below their marginal replacement costs, and as a result they are overused. By holding down the price of domestic oil and "rolling in" the higher price of foreign oil, the United States has actually subsidized oil imports. The entitlements program, designed to equalize the cost of foreign and domestic oil to U.S. refiners, has become an administrative nightmare. Current mandatory oil price controls are scheduled to expire in 1979; and there is great uncertainty as to what system of controls, if any, will exist in the future.

As a result of present price controls on natural gas, discount rates offered by gas utilities, and environmental concerns, large quantities of natural gas are burned by industry and utilities. Consequently, it has become unavailable for use in new homes in many areas of the country. The movement of natural gas from producing to nonproducing States has been discouraged; and serious regional shortages, like the one this past winter, could occur in the future.

The time has come to recognize that, regardless of Government policy, the production of oil and natural gas will cost more in the future than it has in the past. Newly discovered fields are more expensive to develop than existing fields, and additional recovery from existing fields by nonconventional means is more expensive than recovery by conventional means.

It is also time to face up to the realities of the price of foreign oil. It has sometimes been argued that the oil-producing countries should not determine the price of oil in the United States. But, despite all the rhetoric and protestations to the contrary, the fact is that as long as a large percentage of U.S. oil consumption is imported, the world price of oil will continue to be the real cost to the U.S. economy of every extra barrel consumed.

In 1973–74, the oil-producing countries raised the world oil price fourfold. Deregulation of oil and gas prices would make U.S. producers the beneficiaries of those arbitrary price rises, and yield windfall profits from the increased value of oil and gas in existing fields. The producers have no equitable claim to that enhanced value because it is unrelated to their activities or economic contributions.

Government policy must now address the fundamental economic facts of oil and natural gas supply, and the deficiencies and uncertainties of the current system of price controls. It should provide for prices that encourage development of new wells through a more effective distribution of production incentives, but should also prevent windfall profits. It should protect consumers from profiteering, but should also promote conservation by confronting them with the real cost of oil and gas in the energy marketplace.

To achieve these purposes, a new system for pricing oil and natural gas is required. The Administration is proposing a system under which price controls would be made more consistent with national energy policies. Producers would be given adequate price incentives for development of new fields. A crude oil equalization tax would bring the cost of domestic oil up to the world price. It would raise the price of oil to its true replacement cost, and thereby encourage conservation. The proceeds of the tax, which represent the enhancement of value of domestic oil caused by OPEC price increases, would be distributed to the American people on an equitable basis.

Price controls on natural gas would be reformed as a first step toward market pricing through a formula that relates the price of gas to the price of oil.

OIL PRICING

Under the Energy Policy and Conservation Act (EPCA) passed in December of 1975, producers generally are subject to a price ceiling of either $11.28 per barrel for new oil, or $5.25 per barrel for old oil. These pricing regulations encourage additional production from existing fields. However, oil from higher cost new field development is denied the full incentive of the $13.50 world price.

The President's position has been that price controls on oil should be retained as long as world oil prices remain subject to arbitrary control, and domestic supplies are insufficient to meet domestic needs. Therefore, the Plan calls for creation of a new long-range pricing system.

The price of newly discovered oil would be allowed to rise over a 3 year period to the current 1977 world oil price, adjusted to keep pace with the domestic price level. Thereafter, the price of newly discovered oil would be adjusted for subsequent inflation. This measure would establish a domestic incentive price for frontier oil, separate from post-1977 OPEC world prices.

The incentive price would be limited to new discoveries by a definition of "new oil" applicable to oil produced from any well more than 2½ miles from a currently existing onshore well. A well more than 1,000 feet deeper than any existing well within a 2½-mile radius would also qualify for the new oil price. Offshore, only oil discovered on new Federal leases granted on or after April 20, 1977, or old leases which had been abandoned and are subjected to re-leasing by the Government would qualify for this new price.

This price should provide all the incentives needed for the development of new oil production in the United States. It would yield one of the highest production incentives available to producers anywhere in the world. It is more, for example, than the level of producer revenues in the North Sea, where exploration takes place in extremely deep water and thirty-foot waves are commonplace.

There is little or no basis for the assertion that the only reasonable price for all domestic production is the world oil price. In addition to enjoying under this program one of the highest incentives for new oil production available to any producers in the world, the domestic oil industry would find it difficult in the short-run to utilize additional incentives due to physical limitations on the availability of drilling rigs and related equipment. It would make little sense to provide incentives that could not be fully used. This pricing approach would provide the incentives in the future that would produce more energy, rather than increasingly expensive energy.

The increase in producer revenues from new discoveries of oil would provide an incentive for new production, while ensuring that there would be no windfall profits on conventional production from existing wells. Total deregulation would result in a massive transfer of income from the American public to the oil and gas producers, amounting to $14 to $15 billion, nearly 1 percent of the U.S. gross national product.

The $5.25 and $11.28 price ceilings for previously discovered oil would be allowed to rise at the rate of inflation. Where it could be shown on a case-by-case cost basis that the $5.25 ceiling makes production from a marginal well uneconomic, that well would be eligible for the $11.28 price ceiling.

Stripper wells and new tertiary recovery from old fields would receive the world oil price.

In order to ensure that market decisions by consumers are based on the real value of oil, all domestic oil would become subject at the wellhead in three stages over a 3 year period to a crude oil equalization tax equal to the difference between its controlled price and the world price. The first increment of the tax would be applied on January 1, 1978, with two subsequent increments on January 1, 1979 and January 1, 1980. Once the full tax was in place, it would increase in accordance with the world price of oil. However, authority would exist to prevent increases in the tax if the world price increased significantly faster than the level of domestic prices.

To protect consumers, net revenues from the equalization tax would be returned to them in the form of a per capita energy credit against other taxes or in the longer run as part of general tax reform. These "energy payments" would result in lower withholding from weekly paychecks to make it unnecessary to wait a full year for the benefit of the energy credit. The poor who do not pay taxes would also be entitled to their per capita share of these tax revenues. Most would receive their payment through existing income maintenance programs. The remainder would collect their energy payment by applying to one of the existing State agencies through which Federal funds are now distributed. It would be up to each State to designate which agency, or group of agencies, would have the responsibility for distributing energy payments. If the funds from the equalization tax were distributed on this basis in 1980, when the tax is fully in effect, a family of four would receive $188 in energy payments. Home heating oil users would receive an additional share of the equalization tax as a dollar-for-dollar reduction in price when they buy fuel oil.

The oil tax would establish a more realistic energy pricing system, with no net gain to the Treasury, and no net loss to consumers as a group. Once the tax is fully in effect, all domestic oil would have the same price (after tax), and the entitlements program would be terminated, and certain related regulatory activities could be phased out. The entitlements program would be retained in a standby status.

NATURAL GAS PRICING

The Natural Gas Act never contemplated the dramatic increase in demand for natural gas which has resulted from the sudden quadrupling of the world price of oil in 1973–74 and from growing environmental concern in recent years. As a result of regulation under that Act, natural gas is now substantially underpriced, and there is excess demand. Existing supplies are being wasted on nonessential industrial and utility uses. A pricing policy which evolved at a time when gas was a surplus by-product of oil production is no longer sensible in a world where gas is a premium fuel in short supply.

Natural gas price regulation based on historic costs was workable when there were abundant supplies of natural gas. Similarly, the distinction between the unregulated intrastate and regulated interstate markets made little practical difference as long as gas was a cheap, surplus fuel. Producer claims that historic cost-based regulation is no longer appropriate for a premium fuel in short supply are fundamentally correct. But for precisely the same reason, the intrastate-interstate distinction has also become unworkable, indeed intolerable, as the limited amount of new gas increasingly flows to the unregulated intrastate market at the expense of interstate consumers. The shift in the natural gas market from surpluses to shortages requires the abandonment of historic cost-based regulation and of the artificial distinction between interstate and intrastate markets.

Therefore, a new commodity value pricing approach is proposed that applies to all new gas wherever it is used. It recognizes that prices should reflect the costs and the degree of risk associated with finding replacement supplies. This approach also recognizes the need to provide a sufficient incentive for the development of future supplies with substantially higher long-range development costs. By helping bring natural gas supply and demand back into balance, this pricing proposal would be a first step toward deregulation. If the natural gas market could be brought into better balance by the mid-1980's, it might be possible and desirable to move further toward establishing full market pricing.

Under this proposal, all new gas sold anywhere in the country from new reservoirs would be subject to a price limitation at the Btu equivalent of the average refiner acquisition price (without tax) of all domestic crude oil. That price would be approximately $1.75 per thousand cubic feet (Mcf) at the beginning of 1978. New gas entitled to this incentive price would be limited to truly new discoveries. Gas from onshore wells more than 2½ miles from an existing well, or 1,000 feet deeper than any existing well within a 2½-mile radius, would qualify for the new gas price. Offshore, only gas produced from wells on new Federal leases granted on or after April 20, 1977, or old leases which had been abandoned and are subject to re-leasing by the Government would qualify for this new price.

The country would also move toward a single national market for gas, like that now existing for oil. For new production the interstate-intrastate distinction would be eliminated, together with the resulting distorting effect on both production and distribution. Currently flowing natural gas would be guaranteed price certainty at levels currently set by the Federal Power Commission, with adjustments in accordance with changes in the GNP deflator. The Government would have authority to establish higher incentive pricing levels for specific categories of high-cost gas, such as gas from deep drilling, geopressurized zones, and tight formations.

The Federal Power Commission would be given new, more flexible standards for determining the price of natural gas made available at the expiration of existing interstate contracts or by production from existing reservoirs in excess of contracted volumes, but in no case would such gas qualify for a price in excess of the $1.42 per Mcf ceiling (plus inflation). Gas made available under the same circumstances from existing intrastate production would qualify for the same price as new supplies of gas, that is, a price no greater than the domestic oil Btu equivalent. Existing intrastate contracts would not be affected. Because

Goldman Sach Seminar May 1977
Background dope = success traffic projections

States already regulate intrastate pipelines, Federal jurisdiction would not be extended to them except for purposes of allocation during national supply emergencies. This new gas pricing system would increase the supply of gas in the interstate market without precipitously drawing gas away from the intrastate market.

Federal pricing policy would also discourage use of gas by industry and utilities. The wellhead cost of the more expensive new supplies would all be allocated initially to industrial users, not to residential and commercial users, because the latter have far less capacity than industrial consumers to convert to other fuels.

In addition to these wellhead pricing changes, taxes would be levied on the use of oil and gas by industry and utilities, in order to encourage conservation and conversion to coal and other fuels. High volume industrial and utility users of natural gas, except for fertilizer manufacturers and certain agricultural users, would be subject to a use tax. The tax would increase the price of gas to industrial and utility users by about one-third above the Btu equivalent price of world oil over the next 5 years. Utility and industrial users of oil would also be subject to a phased-in conservation and conversion tax ranging from 90 cents to $3.00 per barrel. These measures are discussed in more detail in Chapter VI.

Federal Power Commission jurisdiction would be extended to certain synthetic natural gas facilities. However, the higher price of synthetic natural gas would not be rolled in with the price of natural gas, but rather would be allocated to industrial customers.

It will be at least 3 years before these proposals can significantly improve the natural gas supply situation. Until then, the U.S. will remain vulnerable to natural gas supply emergencies during the coldest months of the year. Because it was needed to keep American homes warm this past winter, the current emergency gas allocation authority would be extended for another 3 years. The need for that authority will be reviewed as the natural gas market comes into better balance.

This pricing approach acknowledges that the true economic value of a depleting resource is its replacement cost. The proposed pricing system would provide the price incentives natural gas producers need and protect homeowners from natural gas prices in excess of levels needed to maintain production.

For both oil and gas, this approach establishes an integrated pricing system that places the incentives on harder to find, new supplies, while ending the distortions of the interstate-intrastate distinction for new natural gas. It provides no reward to any firms that may have withheld natural gas last winter. Under the Plan, there would be about as much gas, oil, and conservation as would result under total deregulation. But, in addition, windfall profits would be prevented, realistic market prices for energy would be established, and part of the higher retail price of oil would be distributed to the American people.

ALASKAN OIL

By the end of 1977, the Alaska pipeline terminal in Valdez, Alaska, should be receiving approximately 1.2 million barrels of oil per day. The current capacity for absorbing additional crude oil on the West Coast is no more than 600,000 to 800,000 barrels per day, leaving another 400,000 to 600,000 barrels of Alaskan oil as surplus.

Active Federal and State involvement will be necessary to assure expedited construction of the best project or combination of projects for receiving Alaskan oil on the West Coast and moving it in an environmentally sound way to inland markets where it is needed. A Federal project coordinator has been designated to coordinate Federal involvement and to work with States in ensuring timely and thorough review of all proposals in order to expedite projects. The Administration will consult with the Canadian Government to encourage timely Canadian consideration of projects that could be constructed in that country.

As the United States reviews its options for transporting Alaskan oil, it is important that the needs of midcontinent and northern tier refiners be taken into account along with those of refiners on the West Coast. The establishment of a long-term transportation system for supplementing supplies in these regions is a matter of high priority. An assessment will also be made of all options that would enable the U.S. to benefit from Alaskan oil in the short term until permanent transportation systems are in place. The options include transshipment of surplus crude to Gulf Coast markets as well as exchanges with other nations.

The 500,000 barrels per day of imports now expected to arrive on the West Coast could also be phased out by a refinery retrofit program that, over the course of the next several years, would enable more high-sulfur Alaskan oil to be refined in California.

In order to reduce the West Coast oil surplus, legislation will also be sought to provide authority to limit production from the Elk Hills Naval Petroleum Reserve to a ready reserve level. This action could reduce the West Coast surplus until the west-to-east transportation systems for moving the West Coast crude surplus are in place or California refiners have completed a major retrofit program. In the meantime, studies will be undertaken to determine the feasibility of producing and selling natural gas from Elk Hills to supply California markets.

Without a comprehensive oil pricing approach, inclusion of Alaskan North Slope oil production in the domestic composite price would introduce a degree of unnecessary uncertainty into domestic crude oil pricing. Because the large volume of new Alaskan oil would initially be moving into the composite average at a wellhead price considerably below the current average, its inclusion could allow price increases in other tiers in the short term. Under the Plan's proposed regulations, this problem would be eliminated. The $5.25, $11.28, and new oil pricing tiers would be guaranteed increases consistent with inflation. Alaskan oil from already developed fields would be subject to an $11.28 wellhead ceiling price, would be exempt from the equalization tax, and would be treated like uncontrolled oil for purposes of the entitlements program until that program is terminated. New Alaskan discoveries would be subject to the new oil wellhead price.

This program grants maximum and certain wellhead price incentives for Alaskan oil production.

OUTER CONTINENTAL SHELF

Oil and gas under Federal ownership on the Outer Continental Shelf (OCS) are important national assets. It is essential that they be developed in an orderly manner, consistent with national energy and environmental policies. The Congress is now considering amendments to the OCS Lands Act, which would provide additional authorities to ensure that OCS development proceeds with full consideration of environmental effects and in consultation with States and communities. These amendments would require a flexible leasing program, using bidding systems that will enhance competition, ensure a fair return to the public, and promote full resource recovery. The Administration strongly supports passage of this legislation.

The President has also directed the Secretary of the Interior to undertake a review of OCS leasing procedures. This review will establish a sound basis for the leasing program and assure adequate production from the OCS, consistent with sound environmental safeguards.

SHALE OIL

Billions of barrels of oil may some day be recovered from shale deposits in Western States if environmental and economic problems can be overcome. Several private firms have announced that they believe they can solve these problems, and that they are prepared to proceed with shale oil development. These commercial ventures should provide valuable information about the viability of a shale oil industry.

Due to the high risks and costs involved in shale oil development, the Government should establish a pricing policy that provides adequate incentives to producers. Accordingly, shale oil will be entitled to the world price of oil.

LIQUIFIED NATURAL GAS

The Energy Resources Council in the previous administration proposed guidelines to limit imports of liquefied natural gas to 2 trillion cubic feet per year. Of that, no more than 1 trillion cubic feet could be imported from any one country. Applications for LNG contracts now pending before the Federal Power Commission already approach the 2-trillion-cubic-feet limitation, with over 1.2 trillion cubic feet proposed to come from Algeria.

Due to its extremely high costs and safety problems, LNG is not a long-term secure substitute for domestic natural gas. It can, however, be an important supply option through the mid-1980's and beyond, until additional gas supplies may become available.

The previous Energy Resources Council guidelines are being replaced with a more flexible policy that sets no upper limit on LNG imports. Under the new policy, the Federal Government would review each application to import LNG so as to provide for its availability at a reasonable price without undue risks of dependence on foreign supplies. This assessment would take into account the reliability of the selling country, the degree of American dependence such sales would create, the safety conditions associated with any specific installation, and all costs involved. This action could add as much as 500 billion to 1 trillion cubic feet annually to U.S. gas supply through the 1980's, without making an open-ended commitment for large volumes of this expensive resource.

The new policy further provides for distribution of imports throughout the nation, so that no region would be seriously affected by a supply interruption. It also provides for the development of contingency plans for use in the event of a supply interruption. In cases where the proposed supplier retains a unilateral right to cut off supply, consideration should be given to conditioning FPC certification on recognition of a reciprocal right to cancel on the part of the U.S. purchaser.

Finally, strict siting criteria would foreclose the construction of other LNG docks in densely populated areas.

SYNTHETIC NATURAL GAS

The nation's current policy toward synthetic natural gas (SNG) made from petroleum feedstocks is not satisfactory. Existing regulations favor the allocation of naphtha and other potential SNG feedstocks to the petrochemical industry, and effectively preclude their use by gas utilities. This policy has discouraged the construction of new SNG plants. Yet, the 13 SNG plants that were operating this winter provided the additional margin of natural gas supply that kept

Goldman Sach Seminar May 1977
Background dope such as traffic projections

several areas of the country from shutting off residential users during the coldest months.

Therefore, a Federal task force will be created to work with the gas utilities to identify those areas of the country where a limited number of additional SNG plants should be built to help meet the critical peakload needs for gas over the next 5 to 7 years. Federal Energy Administration regulations will be revised to provide a priority for SNG feedstocks to those plants approved by the task force. This regulatory change will give pipeline companies and utilities the reasonable certainty they need to make investments for this short-term source of gas supply.

SNG plants could contribute almost 1 trillion cubic feet of gas annually in the 1980's.

NEW SOURCES OF NATURAL GAS

Additional funding in fiscal year 1978 is proposed to encourage private efforts to tap the potential of two resources that may produce considerable quantities of natural gas in the near and mid-term.

To evaluate the technology and economic viability of Eastern Devonian shale deposits, a number of wells will be drilled and advanced recovery will be tested. In addition, the institutional and regulatory arrangements needed to assure effective use of this resource will be studied.

ERDA will assess the dissolved gas potential in the geopressurized zones along the coast of the Gulf of Mexico. The proposed research program is designed to provide a reliable assessment of this resource and to help resolve corrosion and other problems associated with it. The significant environmental and institutional barriers to extensive development of the geopressurized resource will also be examined.

New gas from these sources could materially alter the outlook for U.S. gas supply. Successful development of these resources could provide enough additional gas to assure supplies for residential and commercial use for years to come.

STUDY OF THE NATIONAL ENERGY TRANSPORTATION SYSTEM

During the era of cheap energy, the United States developed a national energy transportation system principally for moving oil and natural gas from the South and the Texas Panhandle to the North and Northeast. With growing prospects for increased supplies of oil and gas from the Outer Continental Shelf, as well as the anticipated increases in coal production, the nation urgently needs to reassess its energy transportation system. It is clear that the energy transportation routes built in the first half of this century will have to be supplemented

by new routes capable of moving the projected mix of energy supplies in 1985 to market. Therefore, the President will create a commission to study the nation's energy transportation needs and to make recommendations to him by the end of this year. One purpose of the study will be to develop means to encourage use of energy supplies nearest to consuming markets, such as eastern coal, in order to reduce the need for long-distance transport.

GASOLINE DECONTROL

Gasoline allocation and price controls are another major area of unsettled oil policy. Gasoline prices have never reached their allowable controlled ceilings, and marketers have contended for some time that deregulation of gasoline would increase competition by allowing them to shop among suppliers. There is little question that gasoline allocation and price controls have distorted what at times has been a competitive market.

In order to assure the maintenance of such competition in the gasoline marketplace, the Administration will support legislation similar in concept to the pending "dealer day in court" bill that would protect service station dealers from arbitrary cancellation of their leases by major oil suppliers. In addition, the Administration currently hopes to eliminate gasoline price controls and allocation regulations at the end of the peak driving season this coming fall. Gasoline prices and market competition will be closely monitored between now and then to assure this policy is appropriate. If gasoline were to be decontrolled, controls could be reimposed if prices rose above a predetermined level. This standby authority would permit the elimination of controls while protecting consumers.

OIL IMPORTS

In February and March of this year, United States imports reached a level of about 9 million barrels of oil per day. The measures proposed in the Plan would reduce total oil demand by 4.5 million barrels per day, resulting in oil imports in 1985 averaging about 7 million barrels per day, 2 million below the levels of February and March of this year. Even with a reduction of oil imports to under 6 million barrels per day, the United States would have to take additional steps to reduce its vulnerability to supply interruptions.

As explained in Chapter III, the sensible policy goal for oil imports is relative invulnerability, not independence. The United States continues to import foreign oil because, even at the high prices set by the oil-exporting countries, it is cheaper than domestic sources of synthetic oil. To eliminate imports would be to sacrifice an economic benefit of major proportions. Imports also reduce the depletion of America's own critical oil reserves. Moreover, by substituting for domestic production, and by obviating the need for immediate massive development of all energy sources simultaneously, imports help maintain the quality of the environment. The United States has no reason to pay the very high cost of trying to achieve energy independence. Even if the U.S. itself were independent, its allies could not be, and the U.S. would have to assist them in the event of an international oil shortage.

The key to a tolerable level of oil imports lies in reducing vulnerability by means of an adequate strategic oil reserve, diversification of foreign sources of supply, and contingency plans. The reserve must be large enough to impose substantial revenue losses on countries imposing an embargo, and to enable the United States to deal with the consequences of any supply interruption. The ability to ride out a supply interruption may reduce the likelihood that any nation or combination of nations would impose one. The availability of the Strategic Petroleum Reserve would help offset the adverse economic effects of a supply interruption.

Accordingly, the U.S. plans to expand the Strategic Petroleum Reserve from the currently projected 500 million barrels to the 1 billion barrel level. Assuming that vigorous conservation measures, including rationing, would be undertaken during a supply interruption, and assuming further that a number of OPEC and non-OPEC nations would not participate in the supply interruption, the reserve is designed to supply somewhat more than 3 million barrels per day. Under these assumptions, a 1 billion barrel reserve would last at least 10 months. This reserve is the best kind of insurance the United States could buy, since it is unlikely that the price of oil will fall in the foreseeable future.

An effective policy to reduce vulnerability to supply interruptions also requires diversification of the sources of oil imports. Some developing countries with major petroleum reserves find it difficult to deal directly with multinational oil companies. Yet such countries need capital and sophisticated technology of the kind U.S. firms could supply, as well as the revenues that resource development would bring. The United States recognizes that government-to-government negotiations may be helpful in dealing with the wide variety of potential obstacles that currently prevent these nations from making a significant contribution to world oil supplies.

Finally, the United States must put in place effective contingency plans. The Administration is transmitting to the Congress a standby rationing plan and demand restraint plans to be available in the event of a national emergency resulting from a supply interruption. The impacts on particular industries and sectors of society would be

substantial. But the contingency plans would be implemented only under conditions of extreme national emergency, when substantial sacrifices in the national interest would be justified. In addition, the Administration is accelerating the preparation of additional contingency plans. These plans would reach all sectors of American life: industry, commerce, transportation, residences, and the public sector. Should a national energy emergency occur and the plans have to be invoked, the burdens would be shared widely and fairly among all Americans.

Goldman Sach Seminar May 1977
Background dope succes traffic projections

Chapter VI.–The National Energy Plan: Coal, Nuclear, and Hydroelectric Power

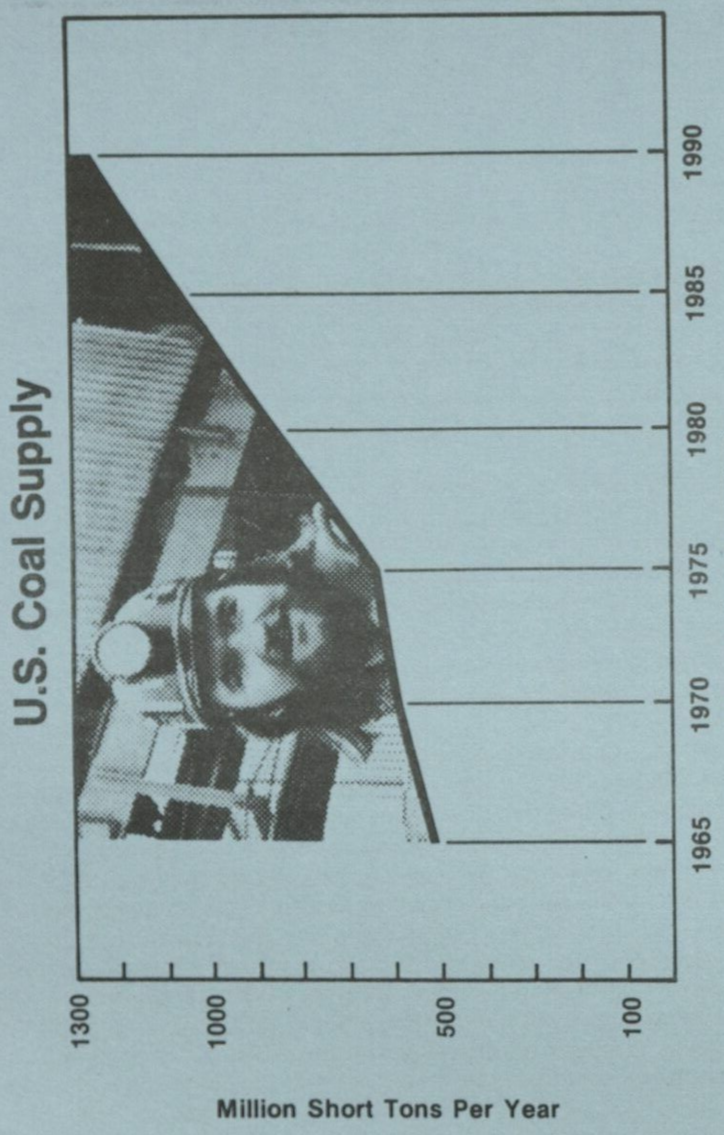
Even with vigorous conservation, America's demand for energy will continue to grow. The United States will need increased domestic energy production if it is to avoid shortages and unacceptable levels of imports. The U.S. eventually will make extensive use of solar and other nonconventional energy sources. During the remainder of this century, however, it will have to rely for the bulk of its energy supply on the conventional sources now at hand: oil, natural gas, coal, nuclear, and hydroelectric power. Federal policy should stimulate the expanded use of coal, supplemented by nuclear power and renewable resources, to fill the growing gap created by rising energy demand and relatively stable production of oil and gas.

COAL

Conversion to Coal and Alternative Fuels

Industry and utilities consumed 4.8 million barrels of oil per day and 5.9 million barrels of oil equivalent per day in the form of natural gas in 1976. Oil and natural gas are scarce, and generally they are needed more by other sectors of the economy. Industry and electric utilities can convert to other energy sources more readily than can other users; therefore, a large-scale conversion by industry and utilities from oil and gas to more abundant resources is needed.

Coal constitutes 90 percent of U.S. conventional energy reserves, but currently supplies only 18 percent of energy consumption. It is generally acknowledged that the coal industry can expand production significantly, and currently has a small amount of excess capacity. (See Figure VI–1.) Full utilization of America's coal resources has been hindered principally by constraints on demand, rather than by lack of supply.



Source: U.S. Bureau of Mines and Federal Energy Administration.

Figure VI–1

Questions have been raised about the adequacy of the nati s transportation system to deliver increased quantities of coal. With the exception of a few areas, it appears that railroads could transport the additional coal. The coal transportation situation will be considered as part of the study of the national energy transportation system. In addition, the Federal Government will monitor coal transportation carefully; and if problems should appear, it will take appropriate action.

Coal development and production is most economical when it is near major markets. Although coal production will expand in many areas, there should be large production increases in the highly populated Eastern and Mid-West regions, where coal use in industry and utilities could grow considerably in the future. The required use of best available control technology for new powerplants should stimulate even greater use of high sulfur Mid-Western and Eastern coals.

Expansion of U.S. coal production and use is essential if the nation is to maintain economic growth, reduce oil imports, and have adequate supplies of natural gas for residential use. Accordingly, to stimulate an increase in demand for coal and other alternatives to gas and oil, the Plan proposes a coal conversion program consisting of tax and regulatory measures.

The tax measures are designed to raise the cost of gas and oil to industrial and utility users, and to provide positive incentives for conversion to other sources of energy. A tax would be levied on industrial and utility use of natural gas and petroleum products. Beginning in 1979, high volume industrial users of natural gas (except fertilizer manufacturers and certain agricultural users) would be affected. They would be taxed an amount equal to the difference between their average cost of natural gas and a price target keyed to distillate oil (without the proposed tax on utility and industrial use of petroleum products). The price of distillate is one third higher than the world price of crude oil. The target level for the first year's tax in 1979 in constant dollars would be $1.05 below the Btu equivalent price of distillate. The target price would rise to the distillate prices in 1985 and beyond.

Thus, in 1979, an industrial user who paid $1.65 per Mcf for gas would pay a tax of $0.30 per Mcf to bring the total cost of gas up to the target level of $1.95 per Mcf, assuming the Btu equivalent price of distillate would be $3.00. By 1985, the target level would rise to approximately $3.30 per Mcf, the projected Btu equivalent price for distillate, resulting in an average tax of $1.10 per Mcf based on a projected actual gas cost of $2.20 per Mcf. Utility users of natural gas would be similarly taxed starting in 1983, at an amount that would bring their cost of gas to a level of $0.50 per Mcf below the Btu equivalent price of distillate. The tax would rise so that by 1988 their cost of gas would

Goldman Sach Seminar May 1977
Background dope success traffic projections
etc back to original files

equal the cost of the Btu equivalent amount of distillate. The later starting date for the tax on utility use of natural gas reflects the longer lead time required by utilities to convert to coal.

Industrial and utility users of petroleum products would be taxed at a flat rate since, unlike natural gas prices, petroleum prices are relatively uniform nationwide. Beginning in 1979, industrial use would be taxed $0.90 per barrel; the tax would rise to $3.00 per barrel by 1985. A tax on utility use of petroleum products would begin in 1983 at $1.50 per barrel and remain at that level thereafter.

Industry would generally be eligible, at its election, for either an additional 10 percent investment tax credit for conversion expenditures or a rebate of any natural gas or petroleum taxes paid, up to the amount of any expenditures incurred for conversion to coal or other fuels. With tax liability delayed until 1979 for industry and 1983 for utilities, prudent investors undertaking an aggressive conversion program should be able to accumulate enough conversion credits to eliminate, or minimize, the actual amounts of tax paid. Only those industrial firms and utilities which lagged behind in conversion would pay substantial taxes.

The Plan also proposes a revised and simplified regulatory program for oil and natural gas conversions. Industry and utilities would be prohibited from burning natural gas and petroleum products in new boilers, with limited environmental and economic exceptions. Industrial firms also could be prohibited from burning gas or petroleum in new major fuel-burning installations other than boilers, by regulations applicable to categories of installations, or on a case-by-case basis. Such orders would be subject to the same limited environmental and economic exceptions.

Existing facilities with coal-burning capability could be prohibited from burning gas or oil, where the burning of substitute fuels would be economically feasible and environmentally acceptable. Facilities burning coal would be required to obtain a permit in order to shift to petroleum or natural gas. Utilities burning gas would require a permit to shift to petroleum instead of coal. By 1990, virtually no utility would be permitted to burn natural gas.

Any industrial firm or utility prohibited from using natural gas would be allowed to sell its contract to purchase gas at a price that would compensate it fully for shifting to petroleum on an interim basis or to coal on a longer term basis.

These regulatory proposals closely resemble a bill sponsored by Senators Jackson, Humphrey, and Randolph. The Administration looks forward to working closely with the Congress to develop an effective fuel conversion program.

Environmental Policy

Attainment and maintenance of the environmental goals set out in the Clean Air Act, the Federal Water Pollution Control Act, and the National Environmental Policy Act are high national priorities. The Administration intends to achieve its energy goals without endangering the public health or degrading the environment.

The Administration has indicated its position regarding a series of amendments to the Clean Air Act. Utilities and industrial facilities will be asked to convert to coal without sacrifice of air quality standards. It is recognized that, in areas with serious air pollution problems, it may be necessary to continue burning oil in order to protect public health. The Administration is conducting a research and development program that will produce new technologies that allow the clean burning of coal more efficiently.

A strong but consistent and certain environmental policy can provide the stability needed to encourage investment in new energy facilities. The Administration has taken a position that all new facilities, including those that burn low sulfur coal, should be required to use the best available control technology.

The Administration has also supported an amendment to the Clean Air Act which would prevent significant deterioration of air quality in areas where air is now cleaner than required by air quality standards. It is committed to protecting national parks and other pristine Federal lands. In order to provide a necessary measure of certainty for the development of new energy facilities, the Administration has recommended adoption of a provision which would encourage States to classify their lands into the various categories within 3 years for protection against significant deterioration. After these initial designations are made, a new energy facility would be subject to those classifications and requirements in effect at the time of application, unless the Governor of the State served notice of an intent to change the classification within 120 days. If a classification is to be changed, the State would be required to complete the redesignation within 1 year. By reducing the amount of time during which the ground rules for locating energy facilities can change, Government would enable energy planning to proceed in a more orderly and expeditious way.

The Environmental Protection Agency will review its current policies allowing offsetting pollution tradeoffs for new installations locating in areas which violate the primary ambient air quality standards. Although the current policy may prove to be the most reasonable strategy for permitting new growth while maintaining progress toward attainment of air quality goals, alternatives should also be explored. The Administration has recommended that no new legislative requirements be adopted in this area until the review is completed. In the interim, the existing EPA policy will be retained.

Some uncertainty will continue over the environmental impacts of an increasing number of coal-burning plants, even those equipped with the best available control technology. Accordingly, the President will appoint a special committee to study the health effects of increased coal production and use, and the environmental constraints on coal mining and on the construction of new coal-burning facilities. The committee will report to the President by next October. In addition, nearly $3 million is being requested to study the long-term effects on the atmosphere of carbon dioxide from coal and other hydrocarbons.

The Administration has recognized the need to protect land and water quality against unwarranted damage resulting from inadequate reclamation of strip mined areas. It continues to support uniform national strip mine legislation that would fully protect the nation's land while permitting the production of coal that is needed to meet national energy objectives.

Coal Research

Coal will meet the greatest portion of increased U.S. energy needs. A comprehensive coal research and development program is a high priority. The program should focus on meeting environmental requirements more effectively and economically, and should seek to expand the substitution of coal for natural gas and petroleum products.

In the short term, most coal will continue to be burned directly. Hence, the highest immediate priority is the development of more effective, economical methods to meet air pollution control standards. Some flue-gas desulfurization (FGD) systems, or "scrubbers," are already in commercial use. Work will continue on overcoming generic operating problems encountered by these systems. A number of new systems are under development, and the Government will undertake a 6 month review to determine whether the new technologies offer sufficient environmental, cost and reliability advantages to justify accelerating the RD & D program. Research into fluidized-bed combustion systems for the direct burning of coal in an environmentally superior manner is being expanded.

In addition, increased research will be devoted to developing means to control the fine particulate and sulfur oxide emissions associated with coal burning. In many situations, front-end coal cleaning by grinding and washing can reduce the free sulfur and ash content and thereby reduce the cost of meeting environmental standards. Accordingly, the Government will expand its current research and demonstration program for coal cleaning to determine what additional efforts are needed to meet sulfur oxide and particulate standards more economically.

Solvent refined coal processes use chemical means to remove even more of the sulfur content. The Government will initiate the design of a commercial-size demonstration solvent refined coal plant in fiscal 1978. If, as expected, pilot plant technical and economic feasibility is demonstrated, construction of a commercial-size plant will proceed.

Pursuant to the Administration's February budget revisions, the Government is proceeding with demonstration projects to develop on a commercial scale techniques for deriving low Btu gas from coal. For example, a large gasification project at a Minnesota ore plant and another at a Pennsylvania zinc smelter have been selected for Government and industry cost-sharing demonstrations. Low Btu gasification processes produce a coal-derived industrial quality fuel that avoids the need for back-end sulfur oxide and particulate control. That fuel could be a major aid in meeting coal conversion objectives.

In the long run, high Btu synthetic gas produced from coal may provide a substitute for declining natural gas supplies. The Administration will pursue an active RD&D program for high Btu coal gasification using advanced technologies. The program will be conducted with the urgency required to ensure that the new technology will be ready when needed.

The basic Federal role in this process is research, development and demonstration of new technologies. In general, the Government seeks to avoid subsidization of existing technologies, although circumstances may sometimes merit an exception to that policy.

The technology for producing synthetic crude oil is not as well developed as synthetic gas technologies. An active RD&D program, including pilot plant demonstrations, will be pursued. The Federal Government currently is providing some of the funding for a 600-ton per day, coal-to-oil pilot facility in Kentucky.

Funding authority for the overall coal program would amount to $527 million in fiscal 1978, and would continue at substantial levels. The success of this program in developing and commercializing new coal technologies will reduce the pressure on dwindling oil and gas supplies. The new coal technologies are critical to the National Energy Plan, both as an immediate aid in converting from scarce to abundant resources and as a future source of synthetic oil and gas.

NUCLEAR POWER

Many countries view nuclear power as their only real alternative to dependence on costly and uncertain oil and gas imports. The United States is in a better position, primarily because of its vast coal re-

Goldman Sach Seminar May 1977
Background dope such as traffic projections
etc back to original files

sources. Coal does, however, have economic, environmental, and health and safety limitations; and, therefore, the United States also must continue to count on nuclear power to meet a share of its energy deficit.

Light-water reactors provide a proven technology to produce needed electrical power. However, more advanced forms of nuclear power may entail significant risk, and must therefore be developed cautiously. The United States has been concentrating on the development of a breeder reactor that uses plutonium, a by-product of uranium in nuclear reactors. In addition, the United States has been developing reprocessing technology to recover the uranium and plutonium in the spent fuel from light-water reactors. Access to plutonium, or even the capacity to recover or isolate it, can lead to the risk of diversion of material that could be used for nuclear explosive devices. The United States should develop advanced nuclear technologies that minimize the risk of nuclear proliferation, but with the knowledge that no advanced nuclear technology is entirely free from proliferation risks.

It is the President's policy to defer any U.S. commitment to advanced nuclear technologies that are based on the use of plutonium, while the United States seeks a better approach to the next generation of nuclear power than is provided by plutonium recycle and the plutonium breeder. At the same time, because there is no practicable alternative, the United States will need to use more light-water reactors to help meet its energy needs. The Government will give increased attention to light-water reactor safety, licensing, and waste management so that nuclear power can be used to help meet the U.S. energy deficit with increased safety.

Proliferation is a world-wide problem. The President announced on April 7, 1977 that the United States will make a concerted effort in association with other countries to find better solutions to this problem. For its part, the United States has adopted two policies. First, it will refrain from proceeding with nuclear technologies that present a high risk of proliferation. To this end, the United States will defer indefinitely commercial reprocessing and recycling of plutonium, as well as the commercial introduction of the plutonium breeder. Second, the President is proposing to reduce the funding for the existing breeder program and to redirect it toward evaluation of alternative breeders, advanced converter reactors, and other fuel cycles, with emphasis on nonproliferation and safety concerns. He also is proposing to cancel construction of the Clinch River Breeder Reactor Demonstration Project and all component construction, licensing, and commercialization efforts. The design work would be completed, and a base level program would be maintained, including the Fast Flux Test Facility. These actions would not seriously affect long-term

energy supplies in the United States. There is, of course, some price to be paid in redirecting this program, but that price is clearly outweighed by the dangers of proceeding.

The United States hopes that these actions will encourage other nations to pause in their development of plutonium-based technology and to examine alternative methods of meeting their future energy needs.

The United States recognizes that for this pause to be feasible, other nations must have assured supplies of slightly enriched uranium required for light-water reactors. The United States must restore confidence in its willingness and ability to supply enrichment services. The Administration, therefore, is prepared, in cooperation with the Congress, to take three steps that will substantially improve confidence in the U.S. position:

— reopen the order books for U.S. uranium enrichment services;
— adopt legislation to guarantee the delivery of enrichment services to any country that shares U.S. nonproliferation objectives and accepts conditions consistent with those objectives;
— expand U.S. enrichment capacity.

Current U.S. enrichment capacity consists of three gaseous diffusion plants which use a technology first developed more than 30 years ago. The time has come to move to the new gaseous centrifuge technology, which consumes less than 10 percent as much electrical power as a diffusion plant of equivalent capacity. In addition, a centrifuge plant has the potential for producing enriched uranium at lower cost. Therefore, the next U.S. enrichment plant, for which funds are already in the proposed fiscal 1978 budget, will be a centrifuge plant.

Light-water reactors require a supply of natural uranium. Current estimates of U.S. uranium resources range between 1.8 and 3.7 million tons. The uncertainties about the extent of domestic uranium resources should be resolved. The Energy Research and Development Administration will reorient its National Uranium Resources Evaluation Program to improve uranium resources assessment. The program will also include thorium, which may be used to breed fuel in some of the advanced nuclear technologies. This program will be a cooperative effort with industry, the States and the U.S. Geological Survey.

Today, 63 nuclear power plants provide about 10 percent of the U.S. supply of electricity. By 1985, an additional 75 nuclear plants already planned or in construction could be in operation, and nuclear power could provide as much as 20 percent of electricity supply.

Thus, the United States has the option of relying on light-water reactors to provide nuclear power to offset a share of the nation's energy deficit without undue risk of proliferation. However, as with

Goldman Sach Seminar May 1977
Background dope suchas traffic projections
etc back to original files

any energy technology, there are risks in the operation of light-water reactors. Although the safety record of light-water reactors has been good, several additional actions can be taken to improve safety.

To protect against possible diversion of nuclear material and against sabotage, the Nuclear Regulatory Commission has already increased the required number of guards at plants and the requirements for the training that guards receive. To improve the overall safety of light-water reactors, the President is requesting that the Commission expand its audit and inspection staff to increase the number of unannounced inspections and to assign one permanent Federal inspector to each nuclear power plant. The President is also requesting that the Commission make mandatory the current voluntary reporting of minor mishaps and component failures at operating reactors, in order to develop the reliable data base needed to improve reactor design and operating practice.

In addition, the President is requesting that the Commission develop firm siting criteria with clear guidelines to prevent siting of future nuclear plants in densely populated locations, in valuable natural areas, or in potentially hazardous locations. Proper siting will substantially reduce the risks of a nuclear accident and the consequences should one occur.

Reform of the nuclear licensing process is clearly needed. The present process is unsatisfactory to all participants: industry, intervenors, and the Federal Government. The President has directed that a study be made of the entire nuclear licensing process. He has proposed that reasonable and objective criteria be established for licensing and that plants that are based on a standard design not require extensive individual licensing.

In addition to licensing problems, construction delays have also contributed to the long lead-times needed to build U.S. nuclear plants. A national industry-labor agreement could lead to a substantial reduction in construction time and increase the willingness of utilities to invest in nuclear power plants.

Finally, the waste generated by nuclear power must be managed so as to protect current and future generations. Improved methods of storing spent fuel will enable most utilities at least to double their current storage capacity without constructing new facilities. Two actions have been taken to ensure that long-term waste storage facilities are available by 1985. The Energy Research and Development Administration's waste management program has been expanded to include development of techniques for long-term storage of spent fuel. Prototype technologies, complete designs, and initial environmental criteria for waste repositories will be developed by 1978. Licensing of the first repository should be completed by 1981. There will be an opportunity for thorough public review at each of these stages. A task force under the direction of the Assistant to the President for energy will review the entire ERDA waste management program.

HYDROELECTRIC POWER

New or additional hydroelectric generating capacity at existing dams could be installed at less than the cost of equivalent new coal or nuclear capacity. Many of these sites are small, but could generate 3 to 5 megawatts, and are located near major demand centers currently dependent on imported fuel oil. Installation of additional generating capacity at existing sites could conceivably add as much as 14,000 megawatts to the nation's generating potential.

The Department of Defense (Corps of Engineers) and other responsible agencies, have, therefore, been directed to report to the Assistant to the President for energy on the potential for additional hydropower installations at existing dam sites throughout the country.

Chapter VII.—The National Energy Plan: Nonconventional Sources and Energy Research

America's hope for energy to sustain economic growth beyond the year 2000 rests in large measure on the development of renewable and essentially inexhaustible sources of energy. Many diverse solar, geothermal, biomass and other technologies are in various stages of development. Some technologies, such as solar hot water and space heating, can make contributions now. Others, such as the solar electric technologies and some forms of geothermal energy, have great promise for the future. Fusion still requires significant scientific progress before its feasibility can be demonstrated. The Government should aggressively promote the development of nonconventional resources despite the fact that they face many uncertainties. The danger of too much initial skepticism is that it may become a self-fulfilling prophecy.

SOLAR ENERGY

Solar hot water and space heating technology is now being used, and is ready for more widespread commercialization. A temporary Federal program of financial incentives and public education is needed to stimulate the development of a larger solar market. As manufacturers, installers, and consumers become more familiar with solar energy equipment, and as economies of scale are achieved, prices should be reduced. Therefore, a tax credit supported by a Federally funded public education program is proposed. The credit would start at 40 percent of the first $1,000 and 25 percent of the next $6,400 (for a maximum of $2,000) paid for installation of qualifying solar equipment. The credit would decline in stages to 25 percent of the first $1,000 and 15 percent of the next $6,400. The credit would be available for expenditures between April 20, 1977, and December 31, 1984. The public education initiative would consist of a joint Federal-State program of standards development, certification, training, and information gathering and dissemination.

This initiative should help launch the solar heating industry. The industry would be further aided by the inclusion of investments in solar equipment among the approved conservation measures eligible for the proposed 10 percent tax credit for energy-saving investments by business. This investment tax credit should encourage the use of solar energy for industrial and agricultural process heat and for commercial operations. Solar energy is likely to be particularly attractive for use in crop drying and other agricultural applications.

The results of the solar demonstration programs being carried out by the Energy Research and Development Administration and the Department of Housing and Urban Development and the equipment performance standards being developed by HUD should help provide a basis for warranties, insurance, and mortgage valuations. Moreover, the Federal Government will demonstrate its confidence in solar technology by undertaking a **3 year program of up to $100 million for installation of solar equipment in Federal buildings.**

The States should also support widespread use of solar energy. A number of them have already amended their property tax laws to exempt solar installations from assessments. It is desirable that the other States do so as well. The States are also encouraged to enact legislation to protect access to the sun and to promote consumer education in the solar field. Under the proposed utility reform program, State public utility commissions would develop guidelines to prevent utilities from discriminating against users of solar energy.

Energy from the sun can also be used without any equipment at all. Through building orientation and design, choice of materials, location of trees and hedges, and other means, "passive" solar systems can be used to obtain heat from the sun when it is needed and to reject it when it is not. More widespread use of passive solar systems would help to reduce fuel bills and conserve conventional fuels.

Solar energy can also be used to generate electricity. The solar electric technologies are in varying stages of development. Photovoltaic systems, using cells developed in the space program, are economic today for certain small, decentralized applications. These systems have a potential for dramatic price reductions that would make them economical for a broader range of applications. Increased funding is proposed to accelerate the development of economic photovoltaic systems. Longer term development is proceeding on central station solar electric power systems. Collection of solar energy by space satellites has been proposed, and the concept deserves further study.

Various technologies make indirect use of solar energy, in the form of wind, agricultural and forestry residues ("biomass"), and ocean thermal energy (the heat captured by the ocean surface). Wind and biomass can make significant regional contributions in the medium term. Wind systems can supply energy to small utilities, hydroelectric systems, and dispersed users of power. Agricultural and forestry residues already are used as fuel, and that use can be increased by improved collection methods and by energy farms, in

which crops are grown specifically for use as energy. In addition, biomass can be used to produce liquid and gaseous fuels for a variety of uses.

The Plan's fuel conversion program would be an incentive for use of biomass, as well as coal. Industry and utilities would have strong reasons to shift away from oil and gas to other energy sources. Tax credits would be provided for investments in facilities to use nonconventional energy sources, as well as to use coal. The environmental problems associated with coal combustion should lead businessmen to take a close look at the advantages of using nonconventional energy sources.

Finally, the Plan's research and development program includes **increased funding for biomass, small wind systems, solar cooling, and other solar technologies.**

MUNICIPAL SOLID WASTE

Municipal solid waste is a valuable energy resource. Its use for energy production also helps to solve environmental problems and reduce municipal disposal costs. Energy can be obtained from municipal solid waste both through direct combustion and through systems for converting wastes into liquid, gaseous, and solid fuels ("refuse-derived fuels").

Greater use of energy recovery systems has been hindered by the availability of cheap, open dumps and by technological and institutional difficulties. However, some plants burning solid waste or producing fuel from it already operate successfully, and present barriers to more widespread use should be overcome with coordinated action by Federal, State and local governments and private firms.

The Plan's fuel conversion program would provide incentives for use of municipal solid waste and refuse-derived fuel as energy sources. Through implementation of the Resource Conservation and Recovery Act of 1976, the Federal Government will continue to help States and local governments to overcome the present barriers to more widespread use of municipal solid waste.

GEOTHERMAL ENERGY

Geothermal energy, the natural heat in the Earth's crust, has a large potential for direct thermal use and for electricity generation, particularly in the Western States. It occurs in many forms, only one of which is currently used to a significant extent. Dry geothermal steam from The Geysers in California provides more than 500 MW. for northern California.

Hydrothermal (liquid-dominated) sites are found throughout the West, some at high temperatures adequate for electricity generation,

Goldman Sach Seminar May 1977
Background dope such as traffic projections
etc back to original files

and others at lower temperatures suitable for heating of buildings. At present, several hundred buildings use geothermal heat. With expected technological progress, hydrothermal sources should begin to make a significant contribution in the 1980's.

Geopressurized resources, located along the Gulf Coast, contain potentially significant amounts of hot water and dissolved methane, which may become accessible in the 1980's. Hot dry rock may become a significant source of energy in the 1990's.

To stimulate the development of geothermal resources, legislation is proposed to extend to geothermal drilling the tax deduction for intangible drilling costs that is now available for oil and gas drilling. The purpose of this proposal is to bring about equality of treatment among activities which compete for capital. The issues concerning the overall allowance of deductions for intangible drilling costs will be reviewed as part of the President's tax reform program.

The Plan's research and development program provides additional funding to evaluate the geopressurized and liquid-dominated hydrothermal resources and to promote the use of geothermal energy in nonelectric applications.

Finally, the Department of the Interior, the Department of Agriculture, and the States will be encouraged to streamline their leasing and environmental review procedures to remove unnecessary barriers to development of geothermal resources.

FUSION

Research in controlled thermonuclear reactions ("fusion") has been a major element in energy research and development programs. However, despite many years of active research, scientific feasibility has yet to be demonstrated, though steady progress has been made in satisfying each of the individual criteria for achievement of breakeven power (the production of more power than is consumed).

Current research on magnetic confinement systems seeks to demonstrate the simultaneous attainment of temperature, density, and confinement time necessary for breakeven. Inertial confinement (laser or beam) systems, a newer technology, may lag behind magnetic systems in achieving breakeven power. Once a demonstration of breakeven is made, extensive engineering efforts would be required to design a commercial system.

However, even without achievement of breakeven power, either fusion system may be able to produce usable energy as part of a hybrid fusion-fission cycle. The fusion process produces neutrons which might breed fuel for light-water nuclear reactors more easily than it produces electricity.

The revised budget submitted by the Administration last February provides for continued work on fusion on an orderly basis.

RESEARCH, DEVELOPMENT, AND DEMONSTRATION

An effective Federal research, development, and demonstration (RD&D) program is indispensable for the production of new energy sources. Research is not an end in itself. The purpose of RD&D is to produce technologies for practical use. The final stage of a successful RD&D program is commercialization, the movement of a functioning technology into the marketplace.

The groundwork for eventual commercialization should generally be laid during the RD&D stage. Before embarking on costly research projects, the Government should have the best possible information on prospects for economic success and institutional acceptance. As scientific and technical advances are made, economic and institutional barriers to commercialization should also be addressed, so that if technical success is achieved in the RD&D program, commercialization can take place rapidly.

However, Government support of scientific research and engineering development does not constitute a commitment to subsequent demonstrations of technologies that do not meet technical, economic, national security, health, safety, and environmental criteria. The Government should support multiple parallel technological options in their early stages, but it should not drift unwittingly into a long-term guarantee of support for all options initially pursued. Only those technologies that satisfy criteria for practical success should be supported into the demonstration stage. Recognition that early Government support should not be regarded as a blank check for the future should benefit the entire RD&D program.

Commercialization activities, and in particular commercial demonstration projects, also must not become a hidden subsidy of technically feasible but economically uncompetitive technologies. Where subsidies are justified, they should be awarded in an open process that is responsive to national priorities.

A balanced RD&D program should have near-term as well as long-term benefits, should promote conservation and nonconventional resources as well as conventional resources, should support small-scale as well as large-scale projects, and should enlist the talents of individual inventors and small business as well as major corporations. In its revisions of the fiscal year 1978 budget, the Administration began the process of reorienting RD&D priorities to meet the country's real needs. The Administration proposed additional funding for the following items:

- —programs to develop improved methods of energy conservation;
- —solar heating and cooling demonstrations, mainly in residential buildings;
- —application of solar energy in agricultural and industrial processes, including more than 60 agricultural projects in more than 30 States;
- —development of improved ways to use agricultural and forestry residues, water-based energy crops, and animal wastes; and
- —development and demonstration of the use of solar and wind energy to operate irrigation pumps and for other rural applications.

In accordance with the priorities set forth in the National Energy Plan, additional funds will be provided for research and development projects for conservation and small-scale energy systems. A new Office of Small-Scale Technologies is also proposed, in order to tap more fully the potential of individual inventors and small business firms.

Additional conservation projects are proposed. The Energy Research and Development Administration will conduct a feasibility study of waste heat recovery and district heating at several of its own facilities. To conserve natural gas, the Government will also fund programs for additional work on gas-fired heat pumps and small fuel cells for residential and commercial heating and cooling.

Other programs may add significantly to the nation's near-term natural gas supply. The Government will provide additional funding to accelerate the investigation of methane recovery from the geopressurized zones along the Gulf Coast and gas from Eastern Devonian shale.

The Government will add several initiatives to its research program to support the Plan's emphasis on increased use of coal, as described in Chapter VI.

The Government will provide increased funding for solar cooling and allied solar technology and for small wind energy conversion systems. It will also support a project to demonstrate the use of wood-derived biomass as a substitute for fuel oil. These projects could yield significant regional benefits.

New initiatives are proposed for geothermal energy. Additional funding will be provided to identify new liquid-dominated hydrothermal fields which could be tapped for direct thermal use. The Government will also support field experiments of direct, nonelectric uses of geothermal energy for residential space conditioning and industrial and agricultural process heat in areas where this resource has not previously been exploited.

The Plan's additional research and development program focuses on projects with near-term and mid-term potential. It emphasizes small, dispersed, and environmentally sound production and use of energy, particularly renewable energy. It also seeks to redress the advantage enjoyed by big business in the Government's current research and development program.

Goldman Sach Seminar May 1977
Background dope success traffic projections
etc back to original files

Chapter VIII.–The National Energy Plan: The Role of Government and the American Public

Government at all levels has a critical role to play in guiding the course of energy production and use. In addition to proposing specific initiatives, the Federal Government should:

—establish clear national energy goals;
—organize itself to administer national energy policy effectively;
—create a comprehensive, reliable repository of energy information;
—ensure competition in the energy industries generally and among the major oil and natural gas companies in particular; and
—provide assistance to low-income people during energy emergencies.

State and local governments will be asked to assume major responsibilities in cooperation with the Federal Government. Nongovernmental organizations and individuals can also make significant contributions to the success of energy policies. The private sector will continue its primary role as the major producer and consumer of energy resources.

NATIONAL ENERGY GOALS

There is no quick or easy solution to the energy problem. The reorientation of American society to the newly recognized energy realities will occur only as a result of a multitude of measures over many years. An important part of the Plan is Congressional adoption of specific national energy goals, so that progress can be monitored and assessed. The proposed goals, to be achieved between now and 1985, are:

—reduce the rate of growth of energy consumption to below 2 percent per year;
—reduce gasoline consumption by 10 percent below the 1976 level;
—reduce oil imports to less than 6 million barrels per day, about one-eighth of total energy consumption;
—establish a Strategic Petroleum Reserve of 1 billion barrels;

—increase coal production by about two-thirds, to more than 1 billion tons annually;

—insulate 90 percent of American homes and all new buildings; and

—use solar energy in more than 2½ million homes.

The Plan does not seek illusory goals, such as energy independence. Rather, it seeks goals that are ambitious, but that are achievable in light of the present widespread waste of energy, and the large potential for conversion from oil and natural gas to coal. However, the proposed conservation goals do not reflect merely what can be achieved by the measures formally proposed in the Plan. These goals are set at more demanding levels in order to take account of voluntary actions outside the scope of the specific measures in the Plan, such as keeping buildings at 78° in the summer and 65° in the winter, carpooling instead of driving alone, and spending leisure time in ways that consume less energy. The goals challenge the American people to go beyond the Plan through voluntary actions.

If the proposed goals are adopted, then, beginning 2 years after enactment of the National Energy Plan, the President will submit to the Congress biannually a report on the nation's progress in moving toward the 1985 goals. The report will recommend any changes in the existing Plan, or any additional measures needed to meet the 1985 goals.

THE DEPARTMENT OF ENERGY

The initiatives presented in the National Energy Plan underscore the importance of creating at the earliest possible date a Department of Energy. Legislation to create this Department has been sent to the Congress by the Administration, and hearings have been held in both the House and Senate.

Although organizational changes alone will not solve any energy problem, creation of the Department of Energy is a necessity if the elements of the Plan are to be carried out in a coherent and effective manner. The Plan proposes a unified policy. The Department would carry out this policy through a unified organization that would coordinate and manage energy conservation, supply development, information collection and analysis, energy regulation, and research, development, and demonstration. Only through creation of a Department that combines the skills and expertise now dispersed through numerous Federal agencies will the Government obtain the comprehensive overview of interrelated energy problems and the organizational coherence needed to implement the National Energy Plan.

By consolidating more than 100 important energy data collection programs in the Federal Government, the Department of Energy would provide comprehensive and reliable energy information. An Energy Information Administration within the Department would organize and analyze information so that it could be used by governments, industry, and the public.

In addition, the ability of the Federal Government to administer the regulatory process when market forces do not suffice would be significantly enhanced by unification of most of the responsibilities for economic regulation of energy. The Department of Energy, operating within congressional mandates, would be able to avoid the inconsistencies and uncertainties inherent in a situation where agencies operate in isolation and sometimes at cross-purposes.

The Department of Energy would enable the Federal Government to coordinate its research, development, and commercialization activities within a policy-planning process that takes full account of the importance of conservation and near-term resource development. The Department would be the most effective means for ensuring that the priorities established in the National Energy Plan are translated into the Government's ongoing research, development, and commercialization efforts.

Finally, by combining the conservation programs of various agencies, the Department would be in a position to ensure that the strong emphasis of the Plan on fostering genuine conservation and improved energy efficiency will not be frustrated by a mass of competing, conflicting, and overlapping jurisdictions in the Executive Branch.

INFORMATION

The Federal Government needs more detailed and reliable information on energy matters than is now available. Much of the nation's remaining reserves of oil and natural gas are located on Federal lands and belong to the American people. More information is needed on the size of particular reserves and the rates at which they are being depleted. To identify and assess possible anticompetitive behavior on the part of major oil companies, the Government needs detailed data on their operations. To deal swiftly and effectively with energy emergencies, such as an interruption of foreign oil supply or a natural gas shortage, governments need information on local energy supplies and consumption patterns.

Goldman Sach Seminar May 1977
Background dope such as traffic projections
etc back to original files

Accordingly, a three-part energy information program is proposed. It would include a Petroleum Production and Reserve Information System, a Petroleum Company Financial Data System, and an Emergency Management Information System.

For the Petroleum Production and Reserve Information System, the Federal Government would assume the data collection responsibilities now performed by the American Gas Association and the American Petroleum Institute. The oil and gas industries would be required to open their reserve estimation processes to Federal officials, who would supervise the collection and preparation of reserve data. Information collected and submitted to the Federal Government through these processes would be verified and randomly audited at the company level. Existing law regarding the protection of confidential proprietary information would not be changed.

The Petroleum Company Financial Data System would require all large companies, and a sample of small firms, engaged in the oil or gas business to submit detailed financial information to the Federal Government. Companies would have to conform to specified accounting principles and to report capital expenditures and operating results by geographical region and type of fuel. They would be required to submit information relating to functional areas, including refining, production, marketing and distribution, and information relating to foreign as well as domestic operations.

This comprehensive reporting program would enable the Government to assess the performance of the industry and individual firms, by providing a system of vertical accountability of the operations of integrated oil companies. The reporting program would restore confidence within the Congress and among the American people that the Government, not the oil industry, is in charge of national energy policy.

The Emergency Management Information System would provide governments with up-to-date information on local energy supplies and consumption. Such information is needed to respond if there should be an interruption of foreign oil supply, a natural gas shortage, or other energy emergencies. State energy offices, assisted by the Federal Government, would collect and maintain the data. As further preparation for possible electrical power shortages in the West this coming summer and natural gas shortages in future winters, the Administration is formulating contingency plans for submission to the Congress under the Energy Policy and Conservation Act.

COMPETITION

Promotion of competition is a critical component of public policy. Since energy is an essential commodity for all Americans, effective

competition within the energy industries is a matter of vital concern. Continuous vigilance is needed to ensure that the structure, behavior, and performance of the energy industries are vigorously competitive.

The Federal Trade Commission and the Antitrust Division of the Department of Justice will continue active programs of enforcement of the antitrust laws in the energy industries. Moreover, the promotion and maintenance of competition would be a major objective of the proposed Department of Energy, and would be the responsibility of a high-ranking official with appropriate staff support.

A prime responsibility of the Under Secretary for policy and evaluation would be to make certain that policies and programs of the Department promote competition. In particular, the Under Secretary would monitor resource leasing policies and rules, and research, development, demonstration, and commercialization programs to ensure that they are carried out in accordance with the purposes of the antitrust laws.

The Under Secretary would also direct an active program to monitor the structure, behavior, and performance of the energy industries. The conduct of individual firms, prices, profits, concentration ratios, and similar matters would be closely reviewed; and any indication of a lessening of competition would elicit a prompt response.

In recent years, trends and practices in the energy industries have created substantial public concern. Attention has focused particularly on the oil and natural gas industries, with special reference to vertical and horizontal integration, as well as joint ventures and the international activities of the major multinational firms.

Public policy toward vertically integrated firms, those that span exploration, production, refining, and marketing of petroleum products, has long been a matter of dispute. The Federal Trade Commission is currently litigating a vertical integration case that addresses some of the relevant legal issues. In recent years, concern about vertical integration has increased due to the possibility that Federal oil price regulations have not held down ultimate prices to consumers, but instead have led to abnormally high profits for refiners. Further investigation is needed to determine whether in fact vertically integrated firms have manipulated profit margins of their various operations in order to circumvent regulations or to exercise market power for anticompetitive purposes.

Horizontal diversification by oil and gas producers, particularly into the coal and uranium industries, has led to concern that the major firms will be able to restrict the development of alternative energy sources. The potential exercise of such power could be detrimental as the nation increases its reliance on coal, uranium, and renewable energy sources.

Traditionally, the structure of the coal industry has been extremely competitive. It is still relatively unconcentrated compared to industries such as steel and automobiles. Nevertheless, recent trends have caused legitimate concern. A total of 32 oil and gas companies accounted for 16 percent of total U.S. coal production in 1974, a 48 percent increase over their share in 1967. These companies accounted for more than 18 percent of coal shipped to electric utilities in 1974, a 27 percent increase over their share in 1967. In 1974, they held 5 percent of total U.S. coal resources, compared to 1 percent in 1967. These figures do not indicate that the oil and gas companies have a dominant position or even significant market power in the coal industry. But the trend of oil and gas company entry into coal mining and the companies' activities and performance merit continuous attention to make sure that a competitive industry does not become noncompetitive.

At this time it does not appear necessary to proceed with new legislation mandating either vertical or horizontal divestiture in order to promote or maintain competition in the energy industries. However, the performance of the energy industries will be closely monitored to make sure that prices are in line with costs and that costs are reasonable. Armed with an efficient organizational structure and new information-gathering programs, the Department of Energy would have an active analysis and evaluation program to study these matters in depth. The proposed Petroleum Company Financial Data System would provide needed vertical accountability for major energy companies. In particular, as the oil and gas companies receive additional incentives, this system would show whether the benefits are being passed through to the public or are being captured as excessive profits by firms with undue market power. If it should appear that there are anticompetitive problems in the energy industries that cannot be reached under current laws, new legislation would be proposed.

The uranium industry is another area of concern that will merit continued attention. Recent rapid increases in uranium prices have raised questions about competition in that industry. In addition, private litigation has produced information that suggests possible anticompetitive actions. Effective competition in the uranium industry must be a matter of high national priority.

The competitive structure of the energy industries depends significantly on the independent producers of oil, natural gas, coal, and solar energy equipment and on the independent refiners and marketers of petroleum products. The Administration supports legislation similar to the pending "dealer day in court" bill. The Department of Energy would seek to preserve the competitive viability of independents in all segments of the energy industries.

Finally, a problem has resulted from the Tax Reform Act of 1976, which changed the tax treatment of intangible drilling costs. Some independent oil and gas producers have lost a tax deduction for such expenses, while corporate producers continue to enjoy the deduction. The law has thus put those independent producers at a competitive disadvantage and has adversely affected their exploratory drilling. This anomaly should be removed as part of the President's program for extending oil and gas price controls. As part of that program, the Administration would urge that independent oil and gas producers receive the same tax treatment for intangible drilling costs that their corporate competitors receive. However, investors who finance oil and gas exploration in order to obtain a tax shelter for income earned in other occupations should not receive such a benefit.

STATE AND LOCAL GOVERNMENT PARTICIPATION

A National Energy Plan can be built only on a foundation of partnership and understanding among the Federal Government, the States, local governments, and the nation's Indian tribes, which regulate or own a substantial part of U.S. energy resources.

Many of the programs proposed in the Plan cannot succeed without the active cooperation of State and local governments. The assistance of State and local governments will also be needed to harmonize the varying interests of the different regions of the country, all of which are affected by national energy policy. State and local governments performed admirably during the recent natural gas shortage, and their role in energy matters should increase in the future.

The States will play a critical role in developing an adequate repository of information for energy decision-making. The States' role in the proposed Emergency Management Information System is particularly important. That system should be of great value to both the Federal Government and the States in dealing with energy shortages. The utility reform program is another instance where the State role is crucial.

The Federal Government is willing to do its part to assist States, localities, and Indian tribes in coping with new energy developments, principally from coal utilization, that will occur under the Plan. Large-scale development places heavy demands on local communities for schools, roads, sewage treatment facilities, and other municipal improvements. Without proper planning for such developments, small communities may be overwhelmed and may be unable to prevent serious social and environmental problems.

Goldman Sach Seminar May 1977
Background dope such as traffic projections
etc back to original files

A variety of existing Federal programs can assist States, communities, and Indian tribes in coping with development of major energy producing installations. A review will be conducted of these programs, and the views of States, local governments, and Indian tribes will be sought. If it should appear that there are gaps in coverage, additional legislation will be proposed.

EMERGENCY ASSISTANCE FOR LOW-INCOME PERSONS

Government at all levels has the responsibility for protecting low-income citizens from the most severe effects of the energy crisis. The Plan contains several programs to carry out that responsibility.

The weatherization program, by insulating large numbers of low-income homes, would moderate the effect of rising fuel costs on low-income families. Proceeds from the crude oil equalization tax and the standby gasoline tax would be distributed in a progressive manner that benefits low-income people. Protection for low-income people from the long-term increase in energy prices lies in a reformed welfare system, on which the Administration is hard at work.

The remaining major problem is the possibility of future supply disruptions, such as the natural gas shortage last winter or another oil supply interruption. Such events could cause temporary, but sharp increases in basic energy costs in some regions, or to users of particular fuels. Such increases are particularly harmful to low-income people, who have little or no discretionary income with which to meet energy price rises. Present programs are deficient in meeting this need. Therefore, the Department of Health, Education, and Welfare will promptly complete a redesigned emergency assistance program for submission to the Congress.

PUBLIC PARTICIPATION

The general strategy of the National Energy Plan reflects the tenor of comments received from the public during the preparation of the Plan. As a general matter, members of the public who expressed views preferred voluntary to regulatory measures, though not uniformly so. The public placed strong emphasis on conservation, stockpiling of oil to reduce vulnerability, and development of solar energy and other renewable or essentially inexhaustible resources. A summary of the public participation in the development of the Plan appears in a separate report.

The announcement of the National Energy Plan marks only the beginning of the effort to deal with the energy problem comprehensively. As the Plan's legislative proposals are considered by the Congress and as its administrative proposals are implemented, they will

be the subject of extensive public comment. The Administration encourages broad national discussion of the Plan and its specific elements.

The President will meet periodically with the Governors to discuss actions that the States can take to deal with the energy problem. The Federal Government will also sponsor additional town meetings and other public events to encourage citizen comment on national energy policy. Private organizations are also encouraged to sponsor seminars and meetings to consider the energy problem and how to deal with it.

But public participation can go far beyond discussion. There is much that individual Americans can do to help the country solve the energy problem. American families can reduce energy waste and their own fuel bills by investing in insulation and other energy-saving home improvements, and by reducing their use of air-conditioners this coming summer. Individuals can use public transportation where it is available instead of automobiles, or, if they must drive, go in car pools or van pools and observe the 55-miles-per-hour speed limit. Schools can help young people understand the energy problem and develop the conservation ethic. Employers can make conservation a high priority in incentive awards and suggestion programs. Business can develop better processes and practices to use energy more efficiently.

In sum, meeting the nation's energy goals should be a great national cooperative effort that enlists the imagination and talents of all Americans. At home, on the road, at work, and elsewhere, all Americans can do their part to help solve the energy problem.

Chapter IX—The National Energy Plan and the Future

To be successful, the National Energy Plan must squarely address the energy crisis and propose actions consistent with the President's principles. The Plan seeks to:

—reduce U.S. dependence on oil imports and vulnerability to interruptions of foreign oil supply;

—lower the rate of growth of total U.S. energy demand and make the U.S. stock of capital goods more energy efficient;

—shift industrial and utility consumption of oil and natural gas to coal and other abundant resources;

—provide incentives for new oil and natural gas discoveries;

—advance the development of new energy sources for the long-term future.

The Plan should be assessed by comparing its results with the likely situation without it. The year 1985 has been selected for the purpose of comparison. The middle of the next decade now appears likely to be the critical time when world oil production will approach the limit of readily expandable capacity. At that time the United States should be prepared for the subsequent period of growing oil stringency.

In some instances, the results of the measures proposed in the Plan may not be sufficient to achieve the goals proposed in Chapter VIII. These goals are ambitious. Their achievement will require voluntary action in addition to the Plan's specific legislative and administrative measures. In some instances, mandatory measures would be considered if voluntary actions are insufficient. The energy savings projected to be achieved by specific proposals in the Plan should be regarded as a basic minimum. Achievement of the Plan's more ambitious goals could be materially aided by the accomplishments of a purposeful citizenry or, perhaps, by unforeseen developments, such as technological improvements in transportation or exploitation of new gas supplies.

Achievement of the goals and strategy of the National Energy Plan could demonstrate the benefits of indicative planning. If private decision-makers voluntarily act within the framework proposed in the Plan, the United States could achieve its energy and economic goals with relatively little direct Government regulation of economic activity.

Goldman Sach Seminar May 1977
Background dope such as traffic projections
etc back to annual files

THE IMPACT OF THE PLAN ON THE ENERGY CRISIS

The first test of the Plan is whether it would make a significant improvement in the trends in energy usage that have produced the energy crisis.

The projections of future impacts are based on certain assumptions about population and economic growth. The U.S. population is projected to increase from 216 million people today to 235 million by 1985. The projections are also based on the assumption that the President's economic goals will be achieved, and that, accordingly, the gross national product (GNP) will increase about 46 percent by 1985.

Without the Plan and without any other Government restraints, U.S. demand for oil could be as much as 25 million barrels per day in 1985. The model projects oil demand in 1985 to be 22.8 million barrels per day, if the automobile efficiency standards under present law are met and if higher gasoline prices since 1973–74 reduce driving. The Plan would reduce oil demand by 4.5 million barrels a day, 20 percent below the projected level of demand without the Plan. Industrial consumption of oil would be reduced from 7 million barrels per day to 4 million.

If U.S. demand for oil were 25 million barrels per day in 1985, oil imports could be as much as 16 million barrels per day. At the level of 22.8 million barrels per day of oil demand, oil imports would be about 12 million barrels per day. The Plan would reduce imports to 7 million barrels per day. Voluntary conservation could achieve a further reduction to the national goal of below 6 million barrels per day.

The Plan is projected to reallocate natural gas to high-priority uses and to stimulate additional domestic production, as shown in Figure IX–1. Total natural gas consumption in 1985 would be the equivalent of 9.4 million barrels of oil per day, with or without the Plan, but the distribution of gas among energy consumers would be altered. Under the Plan, the residential and commercial sector would consume the equivalent of 4.1 million barrels of oil per day instead of 3.8 million, and electric utilities would consume 0.5 million instead of 0.9 million. Total industrial consumption would stay the same, with some industrial shifts of gas use to coal, and some shifts from oil to gas within the total. The Plan would also stimulate additional domestic gas production equivalent to 600,000 barrels of oil per day.

As a result of the conservation initiatives, the United States would achieve an annual rate of growth of energy demand of less than 2 percent by 1985. With additional voluntary conservation efforts, energy demand could be reduced even further.

The Plan would increase the use of coal in 1985 by the equivalent of 2.4 mi[illegible] barrels of oil per day (200 million tons) above the level without the Plan, and 6.5 million barrels per day (565 million tons) above the 1976 level. The effects of the Plan on consumption and supply are shown in Figures IX–1 and IX–2.

Significant progress would be made to prepare the country for the period of oil stringency beyond the mid-1980's. The rate of growth of total energy demand and oil imports would both be brought down to manageable levels. The projections of the effects of the conservation program imply that the U.S. capital stock would have become more energy efficient. The reductions in industrial and utility use of oil and natural gas, and the increase in the use of coal together would represent a very important shift from scarce to abundant resources.

Figure IX–1

Fuel Balances by Sector

[Millions of barrels of oil equivalent per day]

	1976	1985 without Plan	1985 with Plan	1985 Plan plus additional conservation
Demand	37. 0	48. 3	46. 4	45. 2
Residential and commercial:				
Oil	3. 5	3. 2	2. 7	
Natural gas	3. 9	3. 8	4. 1	
Electricity	6. 3	9. 1	8. 4	
Coal	. 1	[1]	[1]	
Total [2]	13. 8	16. 1	15. 2	
Industry:				
Oil	3. 2	7. 0	4. 0	
Natural gas	4. 4	4. 5	4. 5	
Electricity	4. 2	7. 2	7. 1	
Coal	1. 9	2. 7	5. 0	
Total [2]	13. 7	21. 4	20. 6	
Transportation:				
Oil	9. 2	10. 6	10. 2	
Natural gas	. 3	. 2	. 3	
Total [2]	9. 5	10. 8	10. 5	
Electricity: [3]				
Oil	1. 6	2. 0	1. 3	
Natural gas	1. 5	. 9	. 5	
Coal	4. 9	8. 2	8. 3	
Nuclear	1. 0	3. 6	3. 8	
Other	1. 5	1. 6	1. 6	
Total [2]	10. 5	16. 3	15.[illegible]	

See footnotes at end of table.

Figure IX-1—Continued

Fuel Balances by Sector

[Millions of barrels of oil equivalent per day]

	1976	1985 without Plan	1985 with Plan	1985 Plan plus additional conservation
Supply	37.0	48.5	46.4	45.2
Domestic:				
Crude oil [4]	9.7	10.4	10.6	
Natural gas	9.5	8.2	8.8	
Coal	7.9	12.2	14.5	
Nuclear	1.0	3.7	3.8	
Other	1.5	1.7	1.7	
Refinery gain	.4	.9	.6	
Total [2]	30.0	37.1	40.0	
Imports/exports (−):				
Oil	7.3	11.5	7.0	5.8
Natural gas	.5	1.2	.6	
Coal	−.8	−1.2	−1.2	
Total [2]	7.0	11.5	6.4	5.2

[1] Less than 0.05 million barrels of oil equivalent per day.
[2] Detail may not add due to rounding.
[3] Included in previous sectoral totals.
[4] Includes natural gas liquids.

Figure IX-2

Balances by Fuel [1]

[Millions of barrels of oil equivalent per day]

	1976	1985 without Plan	1985 with Plan	1985 Plan plus additional conservation
Oil:				
Consumption	17.4	22.8 [2]	18.2	17.0
Domestic supply [3]	9.7	10.4	10.6	10.6
Refinery gain	.4	.9	.6	.6
Imports	7.3	11.5	7.0	5.8
Natural gas:				
Consumption	10.0	9.4	9.4	
Domestic supply	9.5	8.2	8.8	
Imports	.5	1.2	.6	
Coal:				
Consumption	6.8	10.9	13.3	
Domestic supply	7.9	12.2	14.5	
Exports	.8	1.2	1.2	

[1] Detail may not add up to total due to rounding.
[2] Assuming compliance with automobile efficiency standards under current law, and reduced driving as a result of higher gasoline prices. Without these assumptions, consumption would be 25 million barrels per day.
[3] Includes natural gas liquids.

The reduction of oil imports, together with the expansion of the Strategic Petroleum Reserve, the diversification of U.S. sources of foreign oil supply, and the development of contingency plans would significantly reduce U.S. vulnerability to a supply interruption.

Finally, implementation of the Plan would enable the United States to make a contribution to the maintenance of economic progress and political stability throughout the world. By reducing its own demand for world oil, the United States would help reduce the economic dislocations and political tensions that would result from an intense scramble for diminishing world supplies of oil.

THE ECONOMIC CONSEQUENCES OF THE PLAN

The macroeconomic impacts of the Plan would be quite small in a $2 trillion economy. In view of the range of uncertainty surrounding any econometric projection across a period of 8 years, the following projections should be regarded as merely indicative of the direction of the consequences of the Plan, rather than as precise forecasts.

Various macroeconomic analyses have been examined. From these analyses it appears that the program would not have a negative economic impact. Some analyses indicate the Plan could be slightly stimulative. The effects on employment are consistent with the impact on GNP. The standby gasoline tax, if triggered, would have a slightly dampening effect compared to base conditions.

Inflation would increase on the order of one-quarter to one-half a percent per year over the next 4 years. The smaller number would occur if the standby gasoline tax were not triggered, and the larger number would be more likely if the gasoline tax were in effect.

It is important to emphasize that with or without the Plan, the price of fuels will rise. The Plan would increase the price of fuels somewhat. However, the conservation program would moderate the impact on energy bills and might even offset the increases.

The program is designed to stimulate capital investment in conservation and coal conversion. Between now and 1985, coal conversion would require an additional capital investment of more than $45 billion beyond what would otherwise be required. Four billion dollars of additional capital investment would be required for coal mining. The Plan could reduce new capacity requirements for electric utilities by as much as $40 billion. Thus, the net additional investment required for coal conversion and for new electrical generation capacity could be reduced.

A substantial part of the investment generated by the Plan would go to make homes energy efficient. Estimating the capital cost of that

Goldman Sach Seminar May 1977
Background dope success traffic projections
etc back to annual files

effort is exceedingly difficult. However, the total additional investment probably would be around $20 billion.

The effect of the Plan on domestic automobile sales would be small, but probably positive. However, due to the large uncertainties involved, it is extremely difficult to predict the exact level of new car sales. If the standby gasoline tax were triggered, sales would be slightly lower compared to base conditions.

It should be emphasized once again that all of these projections are subject to a substantial range of uncertainty. They suggest that the National Energy Plan would not adversely affect economic growth. There would be a moderate increase in the rate of inflation. But this disadvantage is outweighed by the impacts on energy use. The future availability of energy has significant economic implications that are not captured by current projections of the GNP or other economic indicators. Standard projections implicitly assume energy will continue to be available at reasonable prices. If it were not available at reasonable prices, all economic activity would be severely affected. An assessment of the economic consequences of the National Energy Plan cannot be made without taking into account the benefit of adequate supplies of energy to maintain the very health of the economy. The economic and social advantages of solving the energy problem are obvious.

THE IMPACT OF THE PLAN ON CITIZENS AND THE ENVIRONMENT

The Plan is based on the principle of equity. Revenues from the crude oil equalization tax would be returned to the economy progressively, as would any revenues from the standby gasoline tax. Although the major price, tax, and regulatory burdens would fall on industry rather than on individuals, those economic burdens would be reflected in higher priced goods and services.

Although energy costs would be generally higher, consumers would receive specific benefits from the Plan. The residential energy conservation program would be available for all households to help reduce energy waste and moderate high energy costs. Residential consumers of natural gas would have more assured supplies, would be protected from the cost of higher priced new gas, and would benefit from the gas utility reform program. Residential consumers of fuel oil would receive an additional share of the equalization tax proceeds as a reduction in price when they buy fuel oil. All users of electricity would benefit from reductions in new capacity construction brought about by conservation, and residential users would also benefit from the

electric utility reform program, which would result in improved utility load curves and, therefore, lower costs. All consumers would also receive, through energy payments from the equalization tax revenues, the bulk of the surpluses generated in bringing oil prices up to the true replacement cost.

American workers would benefit from more assured supplies of energy and a reduced risk of factories shutting down for lack of fuel. There would also be less incentive for industrial firms to move from one part of the country to another in search of reliable fuel supplies. The Plan would also create jobs directly through specific programs such as residential energy conservation, and might have positive indirect effects, as well.

The special needs of the poor and the elderly are addressed. Expansion of the existing Federal weatherization program would particularly benefit the poor and the elderly. The existing HEW Federal-State emergency assistance program would be revised to meet energy emergencies. The progressive nature of the energy payment system is also a benefit. The long-term needs of the poor and the elderly for protection from rising energy prices will be met through a reformed welfare system.

Small firms in the energy industries would benefit from the Plan's emphasis on competition and from the reorientation of the Federal Government's research, development and demonstration programs. Commercial establishments that consume natural gas would benefit from the Plan's pricing proposals.

Businesses would benefit from creation of a single market for natural gas instead of the segmented market that has resulted in the anomaly of plentiful but high priced gas in the intrastate market and cheap but scarce gas in the interstate market. Energy prices would be sufficient to elicit a flow of capital for investment in the energy industries. Investment decisions throughout the business sector would be facilitated by stability and predictability in pricing, environmental and other policies. A healthy business climate for the long run can be preserved only through an effective response to the energy crisis.

Many of the proposed measures would help preserve the quality of the environment. The conservation measures, the support for stringent environmental standards, the emphasis on solar energy and improved technologies for the use of coal, and the measures to increase the safety of light-water reactors are all positive steps.

Implementation of the conservation program clearly is the most important action that could be taken to protect environmental quality while allowing for continued economic growth. The quality of the nation's air would be preserved despite increasing use of coal. The development of solar energy systems would have a modest short-term impact, but over the long run should make a valuable contribution. The proposed steps for siting criteria for nuclear plants, plant inspectors, and waste management, would make important contributions to nuclear safety and safeguards.

Despite the strong environmental measures discussed in the Plan, some uncertainty will continue over the impacts of increasing coal utilization. The President will appoint a special committee to study the health effects of increased coal production and use. In addition, the Government's coal research and development program will be expanded. The program will focus on meeting environmental requirements more effectively and economically.

THE FUTURE BEYOND 1985

The period from 1985 to the end of the century will test the success of the National Energy Plan. If oil importing countries have failed to restrain their demand by the time world oil production levels off, prices are likely to skyrocket and critical shortages are likely to develop. Reduction in the rate of growth of energy demand, combined with additional domestic energy production, should enable the United States to make the energy transition successfully without major dislocations.

More than two-thirds of the additional private investment required to carry out the Plan is projected to be made before 1985, but many of the benefits, particularly of the conservation programs, are much larger after 1985.

Steps taken during the next few years should produce much greater efficiency in vehicles, buildings, and factories. It is realistic to envision a period of growth for the U.S. economy for the remainder of this century, together with a steady reduction in the amount of energy required to drive a car, heat a home, or run a factory. The lower birth rate of recent decades will also reduce energy requirements after 1985. Fewer Americans will be entering the family-forming age group, which creates the largest demand for housing, automobiles, and energy intensive appliances.

If the National Energy Plan is adopted promptly, the nation's energy requirements per dollar of GNP will steadily decline. The United States will have the time it needs to develop sources of supply to build a more reliable energy base for continued economic growth in the 21st century. Growth rates in energy consumption during the 1985 to 2000 period will be significantly below those projected up to 1985.

The present and future markets for energy can be divided roughly into three categories. The first is transportation, which now is wholly dependent on petroleum. The second is high quality, high temperature energy such as electricity or high temperature steam, which is used for most industrial processes and such household needs as lighting and appliances. The sources of high quality energy currently are fossil fuels and nuclear power. Solar electric technologies and certain geothermal resources can also produce high quality energy. The third category is low-grade heat—temperatures below the boiling point of water—which can be used to heat and cool buildings and provide about one-third of the process heat for industry.

Roughly two-thirds of energy consumption requires petroleum or other high-quality energy in the form of fossil fuels or electricity. It is the low-quality energy requirements that could substantially be met by decentralized solar heating and cooling systems, waste heat from power plants, direct use of geothermal energy, or other diffused and less concentrated energy sources. Over the long run, it is wasteful to use high-grade energy sources, such as fossil fuels and electricity, for end-uses that can be satisfied by low-grade heat.

The strategy of the Plan beyond 1985 is twofold. First, it seeks to encourage dispersed solar energy systems, waste heat, and, within geographical limits, direct use of geothermal energy for those uses for which such low temperature energy is adequate. These uses constitute roughly one-third of the total energy market. Second, the Plan seeks to promote the economical, environmentally sound use of various forms of coal, supplemented by nuclear power, for the high temperature needs of powerplants and industry. A variety of other energy sources—solar electric, biomass, municipal solid waste, high temperature geothermal resources and others—would be developed to supplement coal and nuclear power as sources of high grade industrial heat and electricity.

It is possible that by 1985 a significant share of new buildings in the United States will be incorporating solar technology as the primary source of energy for water and space heating and perhaps cooling. Solar energy can also supply some of the low grade process heat needed by industry and agriculture. Geothermal energy, a virtually untapped but potentially large resource, could meet many direct thermal needs in areas near geothermal resources. Both resources could also, during the 1990's, supplement the light-water reactor and coal for generating electricity.

Some very important questions currently remain unanswered. It is not yet clear what energy source will replace petroleum in transportation. Coal can be converted to petroleum products, as Germany demonstrated during World War II, but current synthetics are extraordinarily expensive, more than double the world price of oil. Perhaps electric cars, buses, and trains will be part of a long-term solution for

Goldman Sach Seminar May 1977
Background dope such as traffic projections
etc back to original files

reducing oil consumption. Methanol, an alcohol even now sometimes used for fuel, could also make a major contribution as a substitute or additive to gasoline. New opportunities no one can foresee may appear during the next two decades. The United States will need to pursue research and development on all promising options to determine whether any of them can fill the petroleum gap.

Another major question for the future is the long-term source of electric power. The year 2000 is a short period away in terms of the time required to develop new sources of energy. Nuclear energy was discovered 38 years ago, but today provides only about 3 percent of total U.S. energy. Experience with nuclear energy teaches that the development of a new energy source is not simply a matter of solving technical problems. Assessment of an energy system from the perspectives of health and safety, economics and environmental quality must also be an integral part of any research and development program.

Under the Plan, the Federal Government will pursue a diversified effort to develop new sources that can meet electricity generating needs beyond the turn of the century. The major options include the nuclear breeder technologies, nuclear fusion, centralized solar energy and hot dry rock geothermal resources.

Many countries are developing breeder technologies. These technologies could be made commercial by the end of the century. However, the proliferation risk from a plutonium economy and the availability of energy alternatives make it advisable to defer further development of the plutonium breeder technology. Alternative breeder technologies that do not raise the same proliferation concerns are in the very early stages of development. A diversified breeder research effort should be continued as an option for future energy supply, providing insurance if other alternatives fail.

Fusion power remains an enigma. If proven feasible, it could provide a virtually limitless source of energy. Its scientific feasibility, however, has yet to be established despite years of intensive research, and it may bring environmental problems of its own, which have yet to be evaluated. Fusion research should be pursued in a deliberate and careful manner. The United States cannot now count on fusion power to meet energy needs.

Solar energy is also a possible source of electrical energy for the future. The options available are to generate electricity through photovoltaic systems, power plants in the desert, ocean thermal gradients, biomass or perhaps even space satellites. The economics of all these options are poor at this early stage of development. Solar electric technologies also present various environmental problems that require evaluation.

The current economics of solar electric systems do not doom them for the future. The research and development effort has hardly begun, and the costs of alternative sources of electrical power are rising. Moreover, conventional economics do not reflect solar's major advantages—the absence of the problems of proliferation and safety inherent in most of the nuclear technologies. Even so, it must be recognized that solar electric—as distinguished from decentralized solar—is still an unproved technology. It, too, is not yet an option on which society can rely.

Finally, hot dry rock geothermal resources may provide substantial quantities of high grade energy during the next century. Hot dry rocks deep in the earth contain vast quantities of heat, but no fluid with which to bring the heat to the surface. Before this resource can be tapped, difficult engineering problems will have to be solved.

In sum, the long-term future of electrical energy in America is still open. It is critical that the United States develop a broad range of nonconventional technologies to assure that in the future it will have energy options that are reasonably priced and environmentally acceptable.

CONCLUSION

Implementation of the National Energy Plan would enable the United States to achieve the President's goals in a manner consistent with his 10 principles. The United States would reduce its short-term vulnerability to a supply interruption by reducing oil consumption and imports, by expanding the Strategic Petroleum Reserve, and by proceeding with diversification of foreign oil supplies and the development of contingency plans. Through effective conservation programs, the United States would upgrade the efficiency of its stock of capital goods so that it could weather the period when world oil production approaches its capacity limitation. Thereby, the United States would avoid sudden and possibly severe interruptions in the flow of goods and services resulting from shortages of energy. By proceeding with research, development and, when appropriate, early commercialization of renewable energy sources, the Plan would do much to prepare for the time when oil and gas will be virtually unavailable for energy use and alternative energy sources will be needed.

The effort to achieve the major objectives of the Plan would provide a sense of mission to the American people. Previous generations of Americans have faced major challenges—settling the frontier, industrialization, war, depression. This generation is discovering that it faces a challenge that is equally great—the energy crisis. Meeting this challenge will require sacrifice, hard work, skill and imagination on the part of the American people. It will require a new national ethic that values energy efficiency and condemns energy waste. And it will require a degree of cooperation that the United States has attained only in meeting the great challenges of the past. As the President stressed in his address on April 18, 1977, "This difficult effort will be 'the moral equivalent of war'—except that we will be uniting our efforts to build and not to destroy." The prospect of America organizing to meet the energy crisis is not grim. It is exciting.

Goldman Sach Seminar May 1977
Background dope such as traffic projections
etc back to original files

Smead®
No. 2-153L

HASTINGS, MN - LOS ANGELES
LOGAN OH - McGREGOR, TX U. S. A.